OPTIMIZING PLAY

WHY THEORYCRAFTING BREAKS GAMES AND HOW TO FIX IT

CHRISTOPHER A. PAUL

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Christopher A. Paul

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For Erin, Piper, Ingrid . . . and Amy

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Introduction: Optimization and Common Pool Resource Problems

In the early 2000s a bunch of different aspects of games and sports came together for me. First, I was playing a lot of *World of Warcraft* (*WoW*) and had fallen deeply into raiding. I was structuring my week around finding time to play with up to forty people in an attempt to kill raid bosses and fill out the Netherwind armor set for my mage. I was also watching a lot of sports and reading coverage of advances in how statistical analysis was driving insights into how to best play games. Michael Lewis's book *Moneyball*, published in 2003, heralded the public acknowledgment that analytics and big data offered new ways of conceptualizing how to play sports.[1] And as Blizzard Entertainment launched the first *WoW* expansion in 2007, *World of Warcraft: The Burning Crusade*, I began researching and writing about video games.

As I played the new expansion, I quickly needed to up my game as the battles got more exacting, expecting more from players who wanted to be victorious. I was fascinated by how the idea of theorycraft quickly changed from a marginal hobby in *WoW* into a prerequisite for participation. Theorycraft is an attempt to optimize results, a search for the hidden rules of how the game works to bend them and maximize chances for success. I saw an overlap in how numbers and analytics were being used to play games and sports. *Moneyball* attempted to theorycraft sports, while *WoW* players attempted to optimize their way to success, so I wrote an article about how theorycrafting impacted how players play games and how designers should approach building them.[2]

In the intervening decade and change since I wrote that piece, advances in analytics for both sports and games have exploded. Basketball saw a three-point shooting revolution, where Stephen Curry grew from a second

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year player who attempted 4.6 three-point shots per game in the year my article was published into a player who attempted almost 12 threes per game in 2021–2022 in about the same number of minutes.[3] Sports analytics remade baseball, with baseball's leadership mulling substantial rule changes to counterbalance the impact of theorycrafting-esque practices to speed up the pace of play and move it away from the three true outcomes approach (walks, strike outs, and home runs) that is favored by a mathematical analysis of the game. Contemporary discussion about baseball regularly integrates more data into coverage of the sport, with mentions of WARP (wins above replacement player, intended to judge how good a player is versus a readily available alternative), exit velocity (the speed at which a ball is hit), launch angle (the angle at which a ball is hit), and FIP (fielding independent pitching, which assesses the results a pitcher has control over rather than what happens when a hit ball is in play).

Soccer embraced analytics, with most prominent clubs featuring an analytics department to help them find the ideal players to add to their squad, widespread use of concepts like xG (expected goals based on the location of shots taken), and "pizza" charts that compare players to their peers in key areas like tackles made or progressive passes.[4] Analytics in football made it more common to go for it on fourth down and, in conjunction with rule changes, have pushed the sport toward passing and away from pounding the running game. In the last ten years or so, sports analytics have gone from a rough set of ideas that are frequently mocked into transforming how sports are played.

Video games took to theorycraft even more completely. As players have traditionally been the drivers of theorycrafting, I witnessed the term leap from games like *Starcraft*, where it was thought to be coined, into *WoW* and now into mobile games, sports games, and shooters. As theorycraft spread from Blizzard-developed multiplayer games throughout the video game landscape, the words used to refer to this approach to play changed and evolved. Players did not just talk about theorycraft, unless they came from playing *WoW*, and instead referenced optimization or, more frequently, the most effective tactic available or "meta." However, there was a ton of overlap in the approaches. Pursuing a meta and theorycrafting shared the idea of pushing the boundary and rules of a game to maximize the odds of victory. Fighting games populated tier lists, where characters are ranked based on their perceived power, a practice that has spread throughout game

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genres. Shunning divergent approaches in favor of what is thought to be the most powerful, these tactics dominate large swaths of play in sports and games.

My goal is to analyze the trend toward analytics, optimization, theorycraft, min/maxing, and the meta in video games and sports. Under that variety of banners, play is altered as players shift from open, relatively unstructured interactions into an instrumentalized, scripted joint search for the optimal. The end result of this kind of strategy is to sand the edges off games, flattening them by homogenizing how they are played and limiting the practical choice available for players. As analytic-based approaches spread throughout player bases, they often get normalized as the one true or proper way to play. Any individual player pursuing theorycrafting is not a particular problem for the ecosystem in which a game is played, but when min/maxing becomes dominant within the game's community, choice is limited to a singular answer and games can get less fun to play and far less compelling to watch. When a meta congeals, "everyone" knows relevant strategies and approaches, making it harder to find surprise, awe, and joy in a game. Blending rhetorical analysis with ecological concepts like the tragedy of the commons, I contend that video games and sports are at a point where optimization is a real problem that needs to be addressed and game development should account for how players will leverage their own self-interest against the good of the game as a whole. This is a particularly acute problem for any game with a vibrant competitive ecosystem, particularly one that depends on revenue from broadcasting, like esports and traditional sports. As analytics are pushed to the extreme, individual players and teams benefit, but the overarching game suffers the costs as the end product becomes less interesting and dynamic.

There are many examples throughout this book about how optimization run amok causes problems for video games, but in an effort to establish a baseline for what this argument means in practice, I turn to a pair of children's games and a social strategy reality television show. The first game to consider is tic-tac-toe. Easily drawn in a notebook or with chalk on the ground, tic-tac-toe is a game that many learn at a very young age. It is also a game that is often abandoned not much later as it is easy to optimize and solve. With only nine choices at the beginning of the game and with fewer options after each turn, if players play tic-tac-toe optimally, it will always end in a draw. Knowing how to play tic-tac-toe well means breaking the

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game since only a mistake by one player can lead to the other winning. Once one knows the best way to play tic-tac-toe, the game quickly slides by the wayside, likely only ever to be played again when encountering a child who just learned the game. When a game gets solved and the optimal approach is known, that game becomes uninteresting and boring.

A more complicated children's game is *Connect 4*. Typically played on a grid that is seven columns wide and six rows high, the point of the game is to drop discs into the board so that they stack, with an ultimate goal of getting four pieces of your color in a row. Your opponent attempts to put their pieces in a row while blocking your advances. Likely considered more compelling than tic-tac-toe, *Connect 4* offers limited choices but far more than the nine in tic-tac-toe. Players build a board throughout the game, interacting with their opponent and seeking to stack their own pieces and trap their foe. The game is interesting enough that one National Basketball Association (NBA) player is well known for his appreciation of the game, even as many adults may find it little more than a dressed up version of tic-tac-toe.[5] And much like tic-tac-toe, *Connect 4* is a solved game, one where if you apply the proper strategies for optimized play, you will either win or force a draw. However, there are over four trillion possible moves in the game, which gives the appearance that it is more dynamic. The vast possibilities mean that players who know how the game is solved are more likely to win *Connect 4* than tic-tac-toe because of the surface-level complications their opponent will see, but as a solved game, an optimal approach to play can always force a draw at worst.[6] The fact that there are so many possible options makes the game seem more compelling, but knowing the optimal path still leaves the game flat and featureless unless if one is seeking to dominate those who do not yet know how the game is solved.

In a different vein, *Big Brother US* and *Big Brother Canada* are social strategy games that are broadcast in North America. Based on the original Dutch show created by John de Mol, the North American versions of the game have been generally similar in approach since the second season of the US version. For players, the point of the game is to survive weekly evictions and then be voted by several of their fellow players as the season's winner. For the broadcasting company, the goal is to produce a substantial amount of watchable content, as episodes are shown multiple days a week and ultimately the show fills a dozens of hours of programming at a low production cost. The gameplay is in line with several other social strategy

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games, like *Survivor*, but a distinguishing feature is that the game typically revolves around competitions for the head of household and the nomination of a couple of people to be voted on for eviction. The fact that only one of two nominated players can be evicted most weeks means that competitions to determine who has the power to nominate players and then subsequently whether or not one of those players will be saved are of paramount importance. The game ran without an established meta for years until *Big Brother 16* in 2014, when Derrick Levasseur and Cody Calafiore refined and advanced a strategy that became dominant across multiple North American *Big Brother* seasons.

Levasseur and Calafiore came together quite early in the game and decided to work together. After uniting, they systematically selected other players likely to win competitions and formed alliances with them. As they did this, they built social bonds with those outside of their core group to maintain safety even if their primary allies failed to win a competition. This approach, which noted *Big Brother* live feed recapper Taran Armstrong refers to as an "onion" alliance, emerged to become the dominant approach to the game.[7] Once a player or small group can establish themselves as the center of the onion, they can peel off layers with little harm to their game, especially if they can keep their relationships secret and obscured from the other players. As a strategy for winning the game, this approach became dominant, reaching its apex in season 22 when COVID-19 restrictions led to the casting of an all-returnee season and Calafiore came back to dominate the game. Refining the onion approach, Calafiore won power in the first competition and proceeded to pull together an alliance where he was at the center, and then he marched through the game virtually unopposed as he peeled layers from the onion and eliminated the other players.

The trouble with this kind of meta is that the interests of players, producers/game designers, and viewers do not always align. It is typically in the player's individual best interest to pursue the optimal approach to winning the game. Calafiore's execution of an onion alliance in season 22 was probably the most dominant run in the game; the strategy directly benefited him and his chances of winning. Certainly, players can have other motivations, from using the time on television to build a fan base or sacrificing their game for a friend, but the primary focus of players in a game like *Big Brother* is typically to win. Producers are likely most powerfully motivated by drawing ratings and creating a show that appeals to a large audience

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in order to sell ads, much like large game developers seek to sell copies of their game. Viewers, similar to individual video game players, most often seek an entertaining or compelling viewing experience. The point of watching the show is to see something interesting, and for many of us who like social strategy reality television, the joy often comes from seeing something unexpected and surprising.

The interests of producers and viewers generally align even though the specific execution of how to best realize those goals are often subject to heated debate in the *Big Brother* fandom. However, the overarching interests of players, viewers, and producers are not aligned. The actual players of the game frequently benefit from predictability and stability in the game. The Levasseur/Calafiore onion alliance approach is a dominant meta for success in *Big Brother*, but it is not particularly fun to watch because it decreases the adversity the best players face and severely limits the likelihood of being surprised by an unexpected result. The optimal approach to play can be in conflict with producing the best television to watch.

In the wake of *Big Brother* congealing around dominant alliances that rolled through the game, *Big Brother Canada 10* was exceptional as a big alliance never took hold. The season featured several changes to the game's design and casting, including being the second Canadian season with at least 50 percent of the players identifying as black, Indigenous, and people of color (BIPOC) and a concerted effort to diversify the competitions so that many different players would end up winning power to decide who might be voted out. Instead of a tight group of players moving from one competition win to the next, the first repeat head of household did not come until week seven of a ten-week game. Although some players, most notably Hermon Nizghi, kept trying to form a large alliance, they were stymied at every turn. Eventually, Kevin Jacobs ended up winning the season, becoming both the first person to win the game without winning head of household in more than twenty years and the first person to ever win after being on the block to be evicted in the first week's vote.

The season was filled with twists and turns until the end as opposed to a season with a dominant alliance where the results are incredibly predictable. Jacobs effectively won the game while playing on hard mode, and it was great to watch. He was unlikely to be the kind of player drawn into a Levassuer/Calafiore-style alliance because he was not going to win competitions and keep others safe. However, he was an exceptionally skilled social

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player who used an early bond with Haleena Gill to gather information and work together to consistently undermine the plans of those seeking to solidify power in the hands of a few.[8] His win would be hard for others to emulate and was not an optimal way to play the game, but it made for excellent television.

A similar surprise result occurred in *Big Brother 24*, where Taylor Hale was crowned the champion in a stunningly unusual route to the title. Subjected to an array of harassment in the early and middle sections of the game, *Big Brother 24* was a hard watch, but Hale's route to the win was highly unconventional and in tension with the established *Big Brother* meta.[9] Her marginalization in the house led to the creation of an alliance dubbed The Leftovers that worked together through much of the middle section of the game. Hale's win vindicated the season for many fans as she developed a level of fan support that reached far beyond the bounds of most *Big Brother* seasons. Her personality and presence, combined with the rejection of the optimal route to the win, made the season far more interesting than it was shaping up to be in the first couple of weeks. A dominant alliance can make a player's path smoother, but Hale's social game and tougher route to the end made for a far more compelling story with many more unpredictable twists and turns.

Most interesting games have not been solved, and a key part of what makes them interesting is the variance and surprise that comes from play. Unlike tic-tac-toe or *Connect 4*, *Big Brother* is not solved even if there is a dominant set of tactics to use in the game. However, *Big Brother* is far more interesting to watch when that optimal approach fails and players are forced to find novel paths through the game. Questions stemming from a quick analysis of these three games are at the center of how this book assesses video games and sports. How is an optimal approach developed? How can that meta be upset and changed? What are the stakes of analytics in games? And what lessons can be learned from studying questions of resource allocation and the tragedy of the commons?

The Route to My Argument

I am personally fascinated by the idea of optimization and analytics in games. I vastly prefer to win games than lose them.[10] When I play video games, I play to win, typically playing on a lower difficulty to focus on

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success rather than seeking out challenges to get better at playing. This has put optimization and the meta right in the middle of my game play. I also follow sports and have watched as investment in sports analytics exploded and have seen how insights there run a few years ahead of what happens in video games. However, as rule-bound systems executed on computers, the level of certainty that comes with the attempt to optimize play in video games is much higher.[11] Video games are more of a closed system than sports, although multiplayer games, esports, and ongoing balance patches increase the level of human messiness that accompanies attempts to min/max one's approach in a video game. Ultimately, like a sophisticated version of tic-tac-toe, when enough analytical might is applied, many video games can seem to be "solved."

Throughout this book, I have stitched together commentary about games and sports with an eye toward illustrating the current state of analytics and the stakes of optimization. I chose to represent a variety of games and sports to make a representative argument, but what is here is inevitably driven by my personal interests and knowledge. The point of this work is not necessarily to make an exclusive argument but to make a provocative one with an eye toward making video games more sustainable and interesting moving forward.

My approach is heavily influenced by rhetorical analysis. As I see it, rhetoric is a tool that helps analyze and understand symbol systems, language, and games.[12] In line with Edward Schiappa's work, I believe that "everything, or virtually everything, can be described as rhetorical."[13] This approach to rhetoric comes from a fundamental belief that language is a symbolic system that structures our world and the way we think, as Robert L. Scott puts it, rhetoric is epistemic.[14] At its core, rhetorical analysis is about making arguments about how symbols influence people, how words and systems are deployed in a manner that structures how people think and see the world.[15] In the case of video games, the kinds of games that are produced and how they are designed matter, and those elements also shape who tends to play games and what they are likely to think about them. In the case of approaches to play based on analytics or theorycrafting, the underlying premise is that games are puzzles to be solved and are composed of questions with answers. By pursuing optimization or the meta, players are put in a position where the point is to win, to achieve victory by pursuing the straightest path to that victory.

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Rhetoric is at the core of this project. It is the lens through which I see video games and the discussions around them. This approach also aligns nicely with André Brock's call to not only look at a specific technology in analyzing it but also examine all the pieces around it.[16] However, building my case requires two more key building blocks: the role of statistics and analytics in society at large and the ecological/game theory questions posed by the tragedy of the commons.

Theodore Porter is a historian who focuses on the history of science, with a particular eye toward what he calls "statistical thinking." Porter traced the rise of statistics and their use as a decision-making tool, arguing that science is often presented as ahistorical and unbiased. Seeing science of the natural world as simply the way things are, rather than also considering what questions are likely to get asked and who has the social capital to ask them, are at the center of realizing that science and statistics are ways of seeing the world, much the same as rhetoric. More sharply, Porter's tracing of the forerunners of analytics points out how statistics are constructs that shape how people build their perspective and what they are likely to value.

Porter argues that the idea of objectivity, often venerated by an analytical way of thinking, is more complicated than it may first appear. He writes that

> "OBJECTIVITY" arouses the passions as few other words can. Its presence is evidently required for basic justice, honest government, and true knowledge. But an excess of it crushes individual subjects, demeans minority cultures, devalues artistic creativity, and discredits genuine democratic political participation. Notwithstanding such criticism, its resonance is overwhelmingly positive. Attacks are rarely directed at true objectivity, but rather at pretenders who use it to mask their own dishonesty, or perhaps the falseness and injustice of a whole culture. Most often it is not closely defined, but simply invoked to praise or blame. In the United States, scientists, engineers, and judges are generally presumed to be objective. Politicians, lawyers, and salesmen are not.[17]

The idea of objectivity is celebrated as being objective removes one from tawdry influences. The whole point behind theorycrafting is to find the objectively best way to play a game. And in the case of a solved game, that objective right answer may exist. But for the universe of more dynamic games, cloaking one's argument in objectivity erases the biases and preferences inherent to any sort of judgment call. This critique of objectivity links clearly to an argument Tara Fickle makes about game theory. In her excellent book *The Race Card* she argues that in the minds of early game

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theorists, "game theory provided a means of justifying the rationality and hence fairness of one's decisions."[18] The point of game theory is to aid objectivity, to make decisions on a just and rational basis rather than on one influenced by bias or emotion.

This dilemma of believing that an analytical mode is superior to all others extends to how statistics get used in practice. Working with a group of scholars, Porter and others contend that seeking "the high ground, above the political fray" is one of the reasons why objectivity is sought after and "if it is now said that statistics can prove anything, that is because they are so often (mis)used to *prove* things, not merely to provide reasoned support for a position."[19] Analytics are a tool, but they are not the end all be all. They are part of an answer, but they should be used to inform rather than to establish something as an immutable truth. Writing on his own, Porter notes that a key issue is with causality since the "advantageousness of statistics, however, still presupposes an imperfect knowledge of causal structures, if not incomplete causality."[20] Key assumptions linger behind statistics that are often masked by the interpretation of the numbers; the results may seem unbiased and certain, but reasoning from any sort of statistical analysis is more uncertain than many may think at first blush.

To this end, this conception of statistics links neatly with the idea that rhetoric is epistemic. In *The Empire of Chance* a group of experts on statistics write that "there is no application [of statistics] so innocuous as to be neutral, in the sense of simply mirroring the bare facts of the matter. As we have seen, even the simple act of counting involves assumptions that can color attitudes and interpretations."[21] The process of producing statistics, analytics, or theorycraft matters. Assumptions and beliefs are baked into how data analysis is produced, and those biases necessarily impact how the facts on the ground are understood. This is surely not to say that statistics have no value, but it is important to keep their strengths and limitations in mind. As people produce analytics or methods to min/max their game play, statistical analysis has the impact of reproducing assumptions they may not consider or foreground in their work.

Additionally, those numbers and that worldview feeds on itself and shapes the opinions of those who use them. Statistics and analytics are a symbol system we use to make meaning and better understand the world around us. To that end, they are rhetorical artifacts that can be studied and analyzed. Something as basic as counting and certainly the complicated

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analyses that come into play in analyzing games and sports represent ways of thinking about the world. And those ways of thinking shape everything that comes from them. Pairing this knowledge with rhetorical analysis helps untangle the unspoken assumptions that underlie theorycrafting.

Much like the history of statistics helps chart the ideological implications of using analytics, research into resource allocation illustrates the stakes of optimization and how a seemingly harmless set of decisions by individuals can have a devastating impact on the whole of a community. The idea of a tragedy of the commons originally comes from the work of Garrett Hardin, who argued that continued growth of the population would lead to worse lives for everyone when finite resources ran out. A classic thought experiment in his work was to ponder how a group of animal herders with access to a common field for grazing animals would each have the individual incentive to use as much of the shared resource as possible. However, if everyone acted in their own personal self-interest, the pasture would be devastated and everyone would end up losing out as the resource ceased to exist, hence a tragedy of the commons.[22] Hardin argued that tragedy of the commons problems have no technical solution as they are fundamentally questions of social negotiation and agreement.

For the purposes of this project, it is notable that quite early in the foundational piece about tragedies of the commons, Hardin cited playing tic-tac-toe as an example of a problem with no technical solution. As a game that most adults know is solved and how to always play to a draw at worst, Hardin argued that the only way to win the game is to abandon it. You could win the game by stealing the mechanism your opponent is using to mark their squares. You could demand a double move or otherwise falsify the records. Or you could do what most who know the trick to tic-tac-toe do: you simply do not play the game. The only solution to make the game interesting is to create a social agreement where you just play something else. However, a game designer could present a technical solution. What if the base of the game remains the same, but players must answer questions to get the ability to move? Suddenly, tic-tac-toe no longer leads to as many draws, and the result is transformed into something more like *Hollywood Squares*.

It is also vital to note that Hardin's interpretation of the tragedy of the commons is racist. Listed by the Southern Poverty Law Center as possessing a white nationalist ideology, Hardin's answers to the environmental

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problems posed by the tragedy of the commons was to restrict the "wrong" people from breeding.[23] He engaged in hateful anti-immigrant rhetoric, and throughout his articles published in journals like *Science*, one can see the white supremacy running through his work. Typically, his work starts with straightforward, interesting arguments about resource allocation before the back half of the article talks about solutions that hinge on coercing immigrants and refugees to have fewer children. In his take on technical solutions, he writes that "an implicit and almost universal assumption of discussions published in professional and semipopular scientific journals is that the problem under discussion has a technical solution. A technical solution may be defined as one that requires a change only in the techniques of the natural sciences, demanding little or nothing in the way of change in human values or ideas of morality."[24]

Hardin's morality is twisted, as he clearly called for a reckoning and a change in values and morality where some are cut off from resources or are otherwise limited in their ability to reproduce. Fortunately for the world at large, agriculture's Green Revolution led to massive increases in food production. The problem Hardin identified actually turned out to have a technical solution, but other authors have taken the idea of a tragedy of the commons in different directions, some of whom stayed focused on environmentalism and others introducing the concept into the realm of game theory.

Those who take the idea of the tragedy of the commons and move it away from Hardin's underlying white supremacy typically have far more faith in people as a whole. In a reflection written thirty years after Hardin's original essay in *Science*, Joanna Burger and Michael Gochfeld write that "the traditional theory regarding resource users as unbridled appropriators is being replaced by the recognition that users can communicate and cooperate when it is in their interest to do so and when the resources at their disposal and the sociopolitical context permits it."[25] Burger and Gochfeld reflect on how communication and cooperation can overcome a potential tragedy of the commons. Unlike Hardin's theorized herders who have no regard for the future, the passage of time led to the understanding that people often share limited resources with others and do not always exploit resources to the level that wrecks things for everyone. However, Burger and Gochfeld lay out three key criteria to keep in mind when dealing with shared resources. Participants in the matter must see cooperation

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and communication as something that fits with their individual interests, they need the resources at their disposal to address the situation, and they need to be in a context within which agreement is possible.

These social considerations are important to remember as one considers the potential tragedy of the commons that is present in the use of analytics. Players need to believe that opting out of optimization will not punish them unduly. They need to be given resources to come to agreement on the situation, and they have to be placed in situations where they can strike a deal with fellow players. This is not easy, but these issues are regularly worked out in interpersonal board games and pickup sports games. Encouraging those elements in video games is quite possible, but it takes careful attention and planning. Players need to be put on a similar playing field, one where they are encouraged to cooperate and find answers that work to create the best playing environment for all rather than the one where they are primed to dominate and win.

A second key consideration of the tragedy of the commons found in more recent work is the importance of social rules to govern how people engage with each other. Although the solutions to a tragedy of the commons problem is often unpredictable and unknowable in advance, Carl J. Dahlman argues that Hardin is wrong, that groups of people can work together to find technical solutions. For Dahlman, the failure comes at the legal level. He writes that "the more dense population becomes, the more likely it will be that social rules for regulating population emerge. I have no doubt that future societies will be up to the challenge when necessary and that ideological solutions which offer community and social approval will be reestablished once the failure of legal institutions has become obvious, as I believe it must."[26]

Dalhman's argument is directly aimed at Hardin's contention that society must quickly develop coercive attempts to population control, but I believe his argument is broader as well. His point is that there are certain situations where one cannot simply make something illegal and hope that people fully comply with the dictated solution. Instead, groups needs to work together to determine workable solutions, in line with what Burger and Gochfeld argue. To solve a commons problem, Dahlman believes that a group needs to be able to offer "something in the nature of individual rewards for idealistic behavior" to "be successful in averting a commons problem when they occur."[27]

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In the case of solving a commons problem connected to issues of optimization in a game, developers are likely to run into problems if they simply outlaw the behavior they wish to see eradicated. Banning practices will likely push the behavior underground or lead to the development of other untoward norms within a game. Instead, developers need to leverage players' interest in a better community as a whole to reach an answer that serves all. Getting buy-in from the community and getting players' investment in the change is far more likely to be successful than a top-down edict. Clearly explaining the stakes of the situation and finding a way to properly incentivize desired behavior can lead to the creation of a community and positive social norms that are self-reinforcing. Built well, the answer to a commons problem ceases to be about laying down rules and is actually more about shaping a community and aligning it in a manner where pro-social/pro-game behavior is acknowledged and rewarded. The trick, of course, is finding ways to show players that that their actual self-interest depends on more than the immediate stakes of their next match or raid attempt. Solving a commons problem requires people to think of more than themselves, and there are ways to help get people to that level of pro-social behavior.

More recent analysis often recasts a tragedy of the commons as a common pool resource problem. This reframing focuses on how cooperation and social negotiation are needed to address the issues at stake. The first key piece of addressing common pool resource problems is to develop better communication among participants in the situation. Running a series of experiments on how to best allocate resources and solve for resource allocation problems, Elinor Ostrom, winner of a Nobel Prize for economics work in addressing resource allocation problems, and colleagues found that when given the chance, players in an experiment used their ability to communicate "simply trying to ascertain the optimal, joint strategy."[28] The ability to explain and connect puts people in a situation where they can understand what others are doing and offers a path to figure out the best way forward for all. Communication is a key to building social trust and creating structures in which players can see beyond their own individual needs and wants. Ostrom and her coauthors have a general faith that there is a broad human capacity to solve social dilemmas about the allocation of resources, but they contend that three key features of a social situation can prevent people from working together, writing the following:

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> The first is where individuals have no expectation of mutual trust and no means of building trust through communication and continued interaction. The second is where mistrust is already rampant, and communication and continued interactions do not reduce the level of distrust. The third is where many, but not all, individuals are willing to extend reciprocity to others but lack authority to create their own self-governing institutions. Without the capacity to create rules and establish the means of monitoring and sanctioning these rules, reciprocity alone is frequently insufficient to cope with individuals who succumb to the temptations to cheat.[29]

Effectively, within the case of a video game, a situation needs to be established where players can establish social trust and decrease mistrust through continued interactions. Pro-social players and developers need to work together to create rules, norms, and possibly self-governing institutions to reward those who are playing in alignment with the broader goal of creating a sustainable gaming environment. If developers want dynamics within their game to change, players need to be incentivized to communicate and work together to build structures that work for the game as a whole, thinking beyond their initial self-interest.

Optimization is a tricky problem within games. For individual players or teams, an optimized approach is better, more likely leading to success in an encounter. However, pushed to an extreme, the process of optimization degrades the context of the game for all, even if a player would be better off in a single circumstance by pursuing theorycraft. Seeking an optimal approach to games makes them flatter and less dynamic as all players chase a singular approach to play. Developers also face a risk that many potential options and all the time invested in creating them go by the wayside as players choose their singular, best plan. The imperative for designers is to ensure that their game does not become solved, because the moment it does, they are likely to lose players. Developers also have to watch out for moments where they base their design decisions around theorycrafting. The more a game raises expectations of skill and performance, the more it pushes players to find every edge available. Players suffer from optimization too as they are effectively the dog that finally catches the car and wonders what to do with it.

It is therefore in both designers' and players' interests to retain mystery within the game by not having one clear, dominant strategy that results in winning or drawing the game. Optimization in games is a common pool resource problem; theorycrafting poses a dilemma quite similar to a tragedy

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of the commons. Starting from this understanding and background sets the table for thinking about games broadly. Instead of focusing on your play and how you can be the best in a game, what is the obligation you have as a player to the game as a whole? What is the role you should play in the community of people playing games? And how can we build more sustainable gaming environments moving forward?

Useful Definitions

In an effort at clarity, a particularly useful reviewer suggested having clear definitions of key terms available early in the book as reference. Although many of these terms are defined elsewhere in the book, this section is designed as something readers can turn back to in case they need a refresher on what one of the important terms in the book means.

Theorycraft is placed within its historical context in chapter 1 and is the analytical study of games in an effort to find the optimal way to play. The process of theorycrafting a game typically relies on developing a theory about a game and then testing that approach and collecting data to either validate or invalidate the theoretical holding. The community of players theorycrafting discuss their findings in an effort to collaboratively solve a game. When proven correct, the theory typically becomes canon, and players employ the approach in order to be more successful in future efforts. Theorycrafting began in games such as *Starcraft* and *WoW* but has spread throughout the gaming community.

Similar to theorycraft, but employed in a broader range of games as of this writing, is the term *meta*. Meta, or most effective tactic available, is a more inclusive term. Typically less reliant on the statistical analysis that often typified theorycraft, the meta is a reference to the approach that is dominant in a game at any given time. In the course of this book, players of games like *Overwatch*, *EA Sports FC*, and *NBA 2K* typically refer to the term meta when talking about the optimal approach to their game. A key part of what makes something meta is the communal belief that a tactic is best. While theorycraft uses data to find what is best, the meta is often more about a social understanding, although when either is established as a communal fact they bind the choices made by all players.

Throughout this book, I also use a broader term, *optimization*, to refer to the process players engage in to try to find the best way to do something.

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Optimization is not typically a term used by players, but it is intended to be inclusive of concepts like theorycrafting and the meta. Optimization is about trying to solve something, to make your efforts better in an attempt to be more successful. This term also opens up space to work through how the search for the best way to do something reaches beyond games into other fields, like sports, and how many of us approach contemporary life in general. Although not often used in this book, *min/maxing* is a corollary term for optimization that is frequently used in games. Min/maxing evolved from character building in role-playing games where players seeking the optimal approach to a game would minimize character allocation points spent on certain attributes to maximize what could be spent on more powerful options.[30] Min/maxing grew out of tabletop role-playing games and is now widely used in discussions of many role-playing video games.

Building from a broader notion of figuring out the best way to do something, *sports analytics* refers to how sports teams are increasingly employing data analytics to find the best way to play sports and discover undervalued players to best improve the quality of their team. Beginning with Bill James's work in baseball, which is often referred to as sabermetrics, sports analytics have spread into almost every professional sport as teams seek any edge they can find over their competition. Notably, sports analytics are more widely accepted in some sports and among certain teams more so than others, but the trend is toward the increased use of data to inform decisions. Some sports are regarded as more "solved" through data analysis than others. Chapter 3 focuses on an introduction to sports analytics and an analysis of the most clearly optimized sport, baseball, while chapter 4 takes on basketball, football, and soccer, which have embraced analytics in varying degrees.

Defined largely in this chapter, but a background theme throughout the book, *common pool resource problems* refer to situations where groups have to allocate scarce resources and the decisions they make impact the entire community. Typically, a common pool resource problem refers to a situation where an individual's self-interest is in tension with what is best for the group as a whole. In the case of this book I argue that optimization in games is a common pool resource problem where it is in a player's self-interest to pursue the best approach to win a game, but if all players use the same approach and effectively solve the game, it gets flatter and less interesting to everyone. A settled meta can make a game far less compelling

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as theorycrafting can reduce the universe of possible choices into a singular correct answer. Common pool resource problems are typically solved through social negotiation in situations where there is communal trust and a willingness among participants to think about the interests of the whole rather than just their individual stakes in the situation.

To help these concepts resonate, I have used a variety of examples throughout the books. I focus mostly on video games but have tried to include a range of topics to provide connection points for a variety of readers. My goal is that if one example does not connect with you, the next one might. Sports are the focus of chapters 3 and 4, other kinds of games are woven into some of the video game examples, and the conclusion connects to a variety of mundane ways many of us may choose to try to optimize our lives. Hopefully, these examples also spur readers to reflect on areas where they have either participated in or seen movement toward optimization and give them space to think through how the critique I lay out in this book may change how you think of that situation. The point of the project as a whole is to demonstrate how games offer up space to reflect on how optimization impacts us in our lives. Games are often a representation of our broader cultural trends, and I believe that closely analyzing the impact of optimization in games presents space to reconsider how efforts at optimization are increasingly baked into how many of us live.

What's to Come

Although this project is nominally about video games, much of the space is spent on the foundational material needed to set up the larger argument that runs throughout the book. With that information in hand, it is important to turn back to games and how they work while weaving the material from this introduction into my analysis of video games.

The first chapter focuses on developing the notion of optimization in games. Drawing heavily from what has been written about concepts like theorycraft and the process of seeking an optimal result, the chapter addresses a panoply of games but mostly focuses on massively multiplayer online games, like *WoW*. Although the conventional history of the term "theorycraft" dates the word to *Starcraft*, *WoW* was the game that brought the idea of optimized play into the mainstream for many players. Detailing the idea of a perfect boss fight or an optimal spell rotation helps ground the

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idea of a common pool resource problem in the context of specific games and how they can be understood.

The second chapter addresses another game developed by Blizzard Entertainment, *Overwatch*. Moving from the real-time strategy game of *Starcraft* and the massively multiplayer online game *WoW*, an analysis of *Overwatch* addresses a team-based first-person shooter. Optimization in *Overwatch* is interesting to consider as, unlike in the other two games, it is less a matter of the particular order of a set of optimized keystrokes or moves executed at a specific time and more about team compositions, characters used, and strategies followed. *Overwatch* was also designed for a robust esports scene, with franchises tied to major sports brands and tens of millions of dollars in investment. Esports changes the context for any consideration of optimization as players seek to emulate the game's stars and the broadcasting of specific, successful approaches to the game can lead players to believe there is one preferred mode of play.

As an interlude, chapters 3 and 4 move away from video games to talk about sports and the role of optimization and analytics in contemporary competitive sports. Chapter 3 focuses on an introduction to how processes of optimization have spread in sports and then offers a deep dive into baseball and its status as the most analytically "solved" sport. Basketball, football, and soccer are at the heart of chapter 4, as it moves into sports that have taken some of the analytical lessons of baseball but where the design of the sports makes the implementation of analytics less complete. By analyzing sports, the arguments in these chapters are intended to provide additional context to an understanding of the stakes of optimization and likely one that may not be quite as personal for a fan of video games, providing additional cognitive distance to enable a forthright critique. Taking lessons from another endeavor, one that is contested on a massive scale, and has billions of dollars at stake, gives a different point of reference for how to address concerns of optimization. Although video games are typically overseen by game developers and publishers, professional sports organize around leagues that promulgate rules on behalf of the teams that comprise them. Tensions among teams are natural, but in many sports there are fewer decision makers than in video games, and often there is a regular tradition of rule changes. Additionally, as sports analytics is a multimillion-dollar enterprise in its own right, an analysis of games can be informed by examining what the move to optimizing play has done to sports.

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Building from a focus on sports, I turn back to video games in chapter 5 and analyze *NBA 2K* and *FIFA/EA Sports FC*.[31] The two games form a nice bridge from traditional sports as they are two of the most played sports video games. *NBA 2K* is the leading basketball title, where players can develop their own teams in MyTeam mode, but the most investment is typically placed on MyCareer and MyPlayer. MyPlayer lets players develop their own budding NBA star and lead them through a semiscripted series of life events as they try to establish themselves in the NBA in a mode called MyCareer. MyCareer is important enough for developer 2K Sports that they brough in Spike Lee to direct the 2015 version, and reviews frequently focus on the successes or, more frequently, failures of execution in the storyline.[32] MyPlayer can also be taken online, where players can battle in a variety of playing modes with opponents from around the world. This is the space where optimization happens, as player builds and play styles are hotly debated and frequently slip into surreal representations and strategies that have little to do with the style found in traditional sports as players seek the optimal approach to the video game.

The focus in *EA SPORTS FC* is on Ultimate Team, a mode where players open packages of "cards" to build their own soccer franchise. The packs players can pay for bring in billions of dollars for the publisher and have been subject to litigation and government action in several European countries.[33] In addition to a lively pro scene, often paired with traditional sports soccer leagues, Ultimate Team is notable for the process of optimization pursued by players. Similar to how certain characters are regarded more highly in a game like *Overwatch* than others, in *EA SPORTS FC* the game is both an accurate representation of certain players and a gross misrepresentation of others. The game frequently congeals around similar approaches and one key factor: the speed, or pace, at which players run. Faster players are generally better in the video game even if they are far less celebrated in the sport on which the game is based. Looking at these two game franchises together ties representations of professional athletes and styles of offline sports into the optimization processes of online video game players as they remake what is considered best based on the design of the video game and cast parts of the athletic endeavor aside.

One of the most notable changes since my early work on theorycrafting is how the concept has moved from being a key part of massively successful AAA core titles and seeped into all kinds of multiplayer gaming.

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The economic landscape of gaming has also changed as most video game revenue comes from mobile gaming as of this writing.[34] Chapter 6 focuses on Supercell's mobile game *Clash Royale*. A billion-dollar title that has been near the top of the mobile revenue charts for years, the game blends card collecting with a small multiplayer battle arena where players engage in quick battles to destroy each other's towers. The game is notable in that the developers moved fairly quickly to engage in regular balance adjustments, buffing underused cards to make them more powerful or reworking them altogether and nerfing the most used cards so they are slightly less powerful. Effectively, this means that the game changes slightly every month or so. This process of iteration also alters any sense of a stable, optimized approach as it is likely to be undercut shortly after it debuts and becomes dominant. It is also notable that the approach feeds into the game's revenue model, encouraging players to develop many cards rather than just the eight they can use in most battles. In the case of mobile games or games as a service, players often seek out optimal strategies to decrease their spending, while developers and publishers seek to design their game in a manner that produces optimal revenue generation.

Finally, the book concludes with an attempt to tie the various threads of my argument together, contending that optimization often flattens games and, in cases where players solve a game, breaks them altogether. Tying in brief analyses of additional games, the chapter addresses a variety of different game types, from single-player approaches to social strategy games. Although there is no definitive answer to how to address the problems that can come from players seeking optimal play, there are suggestions for developers and players about how they can continue to keep their games dynamic and interesting. The search for an idealized strategy to play a game has become core to the gaming experience over the last decade or so. Yet should the process continue, it could break games, making them far less fun than they could be while rendering many aspects of particular games irrelevant as what is not optimal is discarded.

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1 The Role of Optimization in Video Games

The reason why players pursue theorycraft is fairly straightforward: they would rather win than lose, and optimizing their play is the most efficient route to being successful in a game. Although searching for every edge has likely been a tenet of games for ages, organized theorycrafting became popular as a variety of forces collided together. First, there has to be a sufficiently complex game to require players to seek out the boundary conditions and the functional rules and limits of the game to achieve success. Second, there needs to be a critical mass of players; the game has to be widely played to generate a large enough community of players to both develop ideas about how to play and then apply them in practice. Third, there must be easy access to other players, which can now be readily accomplished through use of common websites, game forums, subreddits, and the increasing number of games with online components. Combine these factors with a broader social focus on statistics and data analysis, and a trend toward optimizing play moves from the margins to the center of play for many players.

In retrospect, it is not particularly surprising that these forces came together in *World of Warcraft*. The game got increasingly complex over time, adding features and requiring more of all players seeking to defeat the most difficult encounters. The player base of the game was also enormous as it reigned as the most played video game for years before players moved on to other things. And as the game was establishing itself, the popularity of the web was firmly established, and the fact that it was online meant that all players already had access to the internet and at least some facility for communicating on it.

Better understanding how theorycrafting and processes of optimization play out in practice requires digging more deeply into what theorycraft

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is, what its impacts are, and where that leaves games and play. Although a variety of example games will be woven into this chapter, the focus will largely be on *WoW* and how theorycrafting developed there. As an initial beachhead for the development of an optimized approach to play, the practices of players in the game have been well documented, which offers a starting point for understanding the impacts of players' attempts to optimize their play.[1]

Defining Theorycraft

In its most basic sense, theorycrafting was a search for the best way to play *WoW*. It was a quest to figure out the ideal maximum of what a series of choices could do. However, before it was broadly accepted as the best way to play, it was a slur, derided as mere theorycraft rather than actual play. Resistance to theorycraft largely came from some players' desire to play instead of solve math problems. However, as both the expectations of the choices players made and their execution in battle became more exacting, players looked for every tool at their disposal, making theorycraft a crucial part of the game. Trina Choontanom and Bonnie Nardi offer a more complete definition, pushing into how theorycrafting is a communal practice:

> The allure of theorycrafting lies in digging into complex game mechanics. Theorycrafting is a rich, compelling intellectual activity involving hypothesis generation, testing, numerical analysis, logical argumentation, rhetoric, and writing. It is collaborative; theorycrafters work together to gather and analyze data and post their results in public forums to inform theorycrafters and ordinary gamers of their findings—and sometimes to engage in heated debates. Theorycrafting involves analysis of class mechanics, deploying mathematical formulas to calculate theoretical maximums, such as the maximum amount of healing or damage possible under certain conditions. Owing to the constant and changing nature of the game through software updates and expansions, theorycrafters also anticipate upcoming changes, try out projected changes on test servers, and report on their expectations of official releases. Theorycrafting analyses occur outside the game in forums and blogs, permitting players time to write, read, and reflect on posts that are often lengthy, detailed, and deeply reflective.[2]

Choontanom and Nardi offer up a compelling case for why players theorycraft, addressing how the practice is effectively about unraveling unseen aspects of a game and also about spending time in collaboration with others. The practice expands the game, taking it outside of the bounds of pushing

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buttons and healing or doing damage and into the sphere of debate and discussion of showing mastery about how a game works. In line with Mia Consalvo's notion of avatar capital, where establishing one's prowess in a game can have tremendous value within a gaming community, theorycrafting can be about proving one's chops and demonstrating how you understand the game better than anyone else.[3]

In light of the role and prominence of theorycrafting, it is also vital to understand that it is a practice conducted by quite a small number of people and used by far more. As Faltin Karlsen observes, "it is common knowledge that only a few of the people using [inter]net sites actually contribute with content."[4] Instead, most people involved with theorycraft were readers or lurkers in key community forums, intaking what others had produced and then bringing that knowledge back into their playing communities. This is a practice that comes from outside of the game, in line with what Stephanie Boluk and Patrick Lemieux call metagames.[5] Theorycrafting is particularly interesting as that metagame then feeds back into the game and shapes the play within it. A very small number of people engaged in the production of theorycraft; few people were actually engaged in hypothesis testing and data collection. However, a much larger group of people could access and read that information, using it to inform their play. More crucially, many of those who read the source material took it back to their community of players or, in *WoW*, their guild. Suddenly, the knowledge production of a tiny portion of the player base shaped the terms of play for a broad swath of players and drove perceptions about the game and how it should continue to develop.[6]

Although this process of a small group of people informing a larger group until it reaches the hands of individual players may have started as a benign process of trying to improve the quality of play overall, there are downside risks to it as well. Stripped of context and the work and contingencies that went into producing the actual data and theories, readers can take the information as gospel, passing it onto their colleagues as the proper, or even only, way to play. Writing over a decade ago, Tobold, a blogger who focuses mostly on video games and played a ton of *WoW*, argued that the community around these games features "a lot of other players around who will tell you what the 'right' choices are. If your raidleader wants to talk to you about the 'interesting' talent choices you made when building your character, you know what is coming."[7] Tobold uses a famous quote from

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noted game designer Sid Meier for context. Meier argued that "a good game is a series of interesting choices. In an interesting choice, no single option is clearly better than the other options, the options are not equally attractive, and the player must be able to make an informed choice."

As designers and the community around games begin to settle on what is the optimal choice in a given situation, the idea of an interesting choice recedes and players are left following the template provided to them by theorycrafting. As Tobold puts it, "by trying to prevent players frustration from having made bad decisions, developers ended up giving them no choice at all, making games more and more an exercise in following an optimal path. The consequences of every choice are now predictable and one option is clearly better than another, or our choices don't have any consequences at all."[8] This leads to an interesting series of design decisions that must be made by game developers. The instinct to prevent players from accidentally undermining themselves is understandable, but the community around games is also able to analyze and process information so rapidly that any sort of imbalance can quickly lead to a situation where choice evaporates and players are left following the path previously trod by others. This pressure is particularly intense in multiplayer games where players will find it far more difficult to opt out of community expectations when they can be shunned for suboptimal selections and are likely to be constantly pushed back toward what is considered optimal by those around them.

The process of pursuing optimization is still quite interesting. Games need to be sufficiently complex to support a practice like theorycraft in the first place. As Chootanom and Nardi observe, "Theorycrafting can be interesting only if game mechanics produce enough complexity to stimulate theorizing and analysis. The complexity of games such as *WoW* . . . issues partly from the game's design, which organizes players to take on different, complementary roles through character types with varying abilities."[9] There is sufficient depth to a game like *WoW*, combined with the substantial number of people playing it around its peak to support something like theorycrafting. Throughout this book, there are additional examples of games that may not be as complex as *WoW*, but still have people engaging in a process that seems much like theorycrafting.

Questioning the amount of play that actually exists in games with these optimal paths, David Golumbia writes "can there be any doubt about the potential attractiveness of an apparently human world in which we

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understand clearly how to attain power, what to do with it, and that the rules by which we operate do not change or change only by explicit order? The deep question such games raise is what happens when people bring expectations formed by them into the world outside.[10] Throughout his article, Golumbia makes the case that certain kinds of games have become intertwined with work. In the case of developing theorycraft, players are voluntarily conducting tests, logging data, writing up analysis, and then promulgating their findings to the community. Even for those who are not actively involved in identifying the optimal strategies for play, players are reading copious amounts of information, weighing choices, and debating among themselves in order to improve their play. These out-of-game activities have relatively little to do with the traditional notions of what it means to play a game and are a lot more in line with white-collar work.

In the midst of this, Golumbia recognizes the rational choice that comes with such activity. Unlike work and the world outside of games that is frequently unfair and where efforts are not always rewarded, fully identifying the linear structure of a game means that we can act with relative certainty that we know what the outcome of our efforts will be. Optimized strategies reduce the risk and volatility of our efforts, and in the context of the relatively closed system of a computer program, we can gain and wield our power. Golumbia closes with a reflection about what it means for life outside of games for players to consistently learn within video games that there are straightforward routes to power and success only to find out later that is not how life works outside of games.[11]

Although a definitive answer to the dilemma is beyond the scope of what I am seeking to do in this book, it is worth considering how a trend toward analytics and data science in the offline world combined with linear progress and success in games may leave those who play video games with unrealistic expectations about how the world works and questions about how to deal with the inherent fog around many of the decisions we must make in our lives. In line with this, Tara Fickle argues that game theory has long been used to reduce feelings of guilt around decision making. She writes that putting things into the context of a game "appears to allow individuals to forgo the uncertainties associated with emotion and thought in favor of swift and decisive action, reducing complex situations to binary decisions that can be made despite moral ambiguities—and, at least in theory, without the burden of a guilty conscience."[12] The point of

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something like theorycraft is to offload decision making and make choices seem self-evident, unbiased, and scientific. Following a proper finding of game theory is simply pursuing the rational, which eliminates all of the uncertainty and bias that comes with decisions in the rest of the world.

In all of this discussion around theorycrafting and optimization, it is important to remember that seeking to improve, to get better, and to be successful is a drive that is thought to make games special and interesting. In an effort to differentiate between games and play, Bo Kampmann Walther sets up their argument by stating that "play is an open-ended territory in which make-believe and world-building are crucial factors. Games are confined areas that challenge the interpretation and optimizing of rules and tactics—not to mention time and space."[13] Writing in 2003, well before theorycrafting was a thing and over a year before *World of Warcraft* launched, this distinction between games and play is meaningful.

In alignment with this position, Jesper Juul argues that "playing a video game tends to involve rationally optimizing our strategy in a very work-like fashion, playing toward goals and evaluating game objects exactly for their utility."[14] Juul argues that video game players often act in ways that emphasize "rationality and optimization," separating players from a notion of games as a kind of contemplative art.[15] Play and contemplation can happen outside of the context of games, yet games bring the search for an optimal approach into the activity of playing them. However, in line with the arguments above, it is relevant to note that when pushed to the extremes of theorycraft, the activity around games has far more resemblance to work than to play, and the downside impacts of optimization carry larger stakes for some players than others. Given this backdrop of theorycraft, both what it is and how it impacts play and players, it is relevant to look more deeply at the impact the search for the optimal approach has on video games.

Impacts of Theorycrafting

There are two primary realms in which to assess the stakes of theorycraft. First, it is necessary to consider a general focus on the algorithmic approach to problem solving in the first place. With that in hand, it is important to zoom in on theorycraft and video games specifically to see how the practice of design and play shifts in an environment where players are consistently pushing boundaries to find the best way to do things. Bringing

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both a broad perspective on how algorithms work and a grounded focus on theorycraft facilitates analysis and discussion about where the widespread acceptance of theorycrafting leaves games, setting up a deeper analysis of specific games to help clearly see the impacts of optimization.

One way to elucidate the full range of impacts that analytical approaches to play has on video games is to focus on the frequent celebration of the algorithm. In a great essay that draws from theorists including Safiya Noble and Nick Seaver, Aaron Trammell and Amanda L. L. Cullen make the case that game players frequently appeal to an "unknowable language of the algorithm" to maintain power in gaming spaces.[16] In the case of video games, the algorithms at stake are typically exactly what theorycrafting is trying to illuminate. Trammell and Cullen make an effective case that player discourse, like efforts at theorycrafting, has a material impact on play and choices within a game. They argue that "the shape of the ideological space produced by game algorithms is more important than the lines of code that constitute the materiality of the algorithm. Furthermore, the sense-making activities of players reveal that algorithms are not abstract processes hidden inside the game; algorithms play an active role in the production of knowledge in everyday life."[17] Much like rhetoric, algorithms are epistemic: they shape how we understand the world and what we can see or not see. As a process in a game is broken down by players, whatever knowledge they produce will shape what their future questions are and what they are likely to consider. When a group begins to see video games as a set of algorithms to be solved like math equations their relationship to the game becomes more instrumental, and at least a subset of that group is likely to focus on flexing their knowledge and power over others.

The impact of what Trammell and Cullen refer to as an algorithmic bias can be seen in the dance between developers and players over theorycraft. Designers need to retain open questions and unknown answers to keep their game from being solved and becoming stale. On the other hand, players seek to find edges to make their efforts in the game more successful. This can lead to a dilemma as the harder designers make the game, the more they push players to figure out what is optimal. Once algorithmic bias begins to tip a game toward the instrumental, the cascade can be hard to stop. Writing about raiding in massively multiplayer online games, Tobold contends that the focus on players choosing based on optimization or fun comes down to how hard the end game raids are. Tobold writes that

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> I get tons of negative comments every time I ask for MMORPGs to have relatively easy endgame raids, along the lines of "u r just too stupid to play hard raids." But fact is that the harder you make content to beat, the less options players have to beat that content. If players really *need* the 1.7% more dps from talent A to beat the typical raid boss, it is hard to blame them for all using the same cookie cutter build of the month. If the challenge is somewhat easier, different combinations of talents and tactics can all work, and we end up with a more interesting and varied MMORPG because of that. One that allows us to still care about the world and our characters, and not only about our stats and performance.[18]

In this manner, designers have a key role in determining how much a fetishization of the algorithm will play in their game. A choice is only really a choice for players if they can pick either side of it, but when the encounters against foes and social pressure from others tilts the game toward one clear answer, then choice quickly become illusory. This is where concerns about theorycrafting are very much in line with the idea of the tragedy of the commons or a common pool resource problem. As each player opts to pursue a deconstruction of the "black box" of a multiplayer game, everyone else is pushed farther toward joining them in their pursuit of the best way to play. We all degrade the resources for each other, but as Tobold observes, developers can set the tone and design battles in a way that celebrates choice and exploration of a world rather than pushing players to follow a template like everyone else.

The negative impacts of theorycrafting are most clearly seen in multiplayer games, where interactions with others are at the heart of play. As developed throughout this book, there are cases where single-player games have issues with theorycrafting, but for the most part, the issues in a single-player game are when the game becomes boring too quickly and can be addressed with a change in the game's difficulty level. Optimization in single-player games often comes in the form of walkthroughs or guides, and as Mia Consalvo details, there is intense debate among players about whether or not using those resources is appropriate.[19] In multiplayer games, however, players are working with teammates, opponents, or both. And all of these relationships stand to impact how a push toward optimizing play impacts the playing experience of everyone playing the game. The stakes are simply different when other people are involved.

As Cody J. Reimer argues, the key tension in the perception of theorycrafting is when it is forced on others. He writes that "the heart of this dissonance is in the prescriptivism attached to theorycrafted 'findings.' It's

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one thing for a player to believe they have found the optimal way to play; it's another thing entirely when they prescribe those beliefs onto others, and ridicule them for not sharing that belief, or caring at all."[20] Reimer uses analysis of *League of Legends* to contend that those in favor of theorycrafting often work as gatekeepers, determining what types of play are acceptable experimentation and what is proper play for those who are actually trying to be successful. Arguing that this gatekeeping can readily lead to a "toxicity escalated by an ethic of expedience," he argues that the careful dance among players becomes a lot less open and fluid when there is the perception of a particular right way to play or best champions to choose.[21] By both forcing an optimized method of play on others and gatekeeping those who dare step out of line, theorycrafting can make multiplayer games flatter and less dynamic.

Although the apparent goal of an optimized approach to play is to become more successful and more likely to win, that pursuit has notable externalities, one of the most prominent of which is that metagaming highly encourages conformity to the accepted norms in a game community. In an analysis of *League of Legends*, Scott Donaldson focuses on how adhering to the meta, the most effective tactic available, is an expectation from those in the playing community. He writes that

> alluded to in this article is a distinction between conventional and unconventional forms of play—in my experience, I have found that in competitive play, conforming to the conventions of the metagame is an implicit part of behavioral etiquette, and breaking the meta can often be met by rejection from allied players. Even though Riot state clearly that a player cannot be punished for playing an off-meta champion, position or role, or purchasing an offmeta item "build," players are still expected to conform to what is collectively considered the best way to play.[22]

Although playing in your own exploratory play style is definitely not against the official rules of the game, conformity is a key part of the norms governed by players. Riot Games, the developer for *League of Legends*, has incentives to keep players happy and generally encourages them to try more of the champions/characters they have painstakingly designed. On the other hand, many players have a primary interest in winning matches, particularly in improving their ranking in competitive play. This drive evolved into a system where the expectation is that all players will follow what is commonly understood as the meta approach, choosing champions

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and playing their roles in a way that is "known" to be successful. Players police themselves, pushing others to accede to the norms of the community through chat messages, reporting players who step out of line, and simply refusing to play with those who opt for a novel approach. Developers have a key role in crafting the community of players in their game, but once the theorycrafting genie is out of the bottle, optimizing a game often means getting other players to fall in line with the plan.

The social dynamics and push toward adhering to norms within a game is predicated on how theorycrafting changes the way players actually go about playing a game. In analysis of theorycrafting in *World of Warcraft*, Kristine Ask finds that there are a pair of key impacts on play. First, there is a "standardization of play along theorycrafting ideals" as "the many viable options of play styles and preferences were reduced into a ready-made subset of choices, making customization of avatars more about keeping in line with standards, and less about personal expression and preference."[23] In line with Tobold's argument about how designers making battles harder means that players will actually end up making fewer choices, Ask finds similar social pressure in *World of Warcraft* as Donaldson found in *League of Legends*. In her research Ask found that groups of players enforced a standardized approach to play, demanding "players adhere to theorycrafting standards by rejecting those who did not show any affinity for it and training those who did not incorporate it."[24]

In addition to this social pressure, Ask argues that a "second effect of theorycrafting was the centralization of numbers" as a variety of guides and logs rendered play "measurable, quantifiable, and representable through graphs, simulators, or spreadsheets, making numbers and empirically based reasoning the language of play."[25] Play shifted and changed under a regimen of theorycrafting; instead of Sid Meier's exultation of games as a series of interesting choices, theorycrafting flattens the options, prescribing what is best and then allowing players to track execution to ensure others are up to snuff. Rolled into a player culture where optimization is the unquestioned and natural order of play, standardization and calculation rule the day. The search for the meta frequently puts players in situations where they enforce a central belief of either getting in line with what is best or not playing at all.

The overarching impact of theorycrafting on play is complicated. For individuals, optimizing play can lead to more efficiency and success. But when the meta is applied in a group setting, the impacts are far more

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complicated as players lose their ability to make choices and tend toward adherence to the norms to avoid being shunned. The terminal impact of this process is articulated by Trammell and Cullen, who conclude their article "by asserting that when players work to understand the algorithm they are doing the work which maintains patriarchy. By asserting control over the algorithm—which we argue cannot actually be known—players position themselves as discursively more knowledgeable than others. This hierarchical relationship between players reinforces the very patriarchal power structures that inundate gamer culture."[26]

Lisa Nakamura puts the pressure on players in video games slightly differently, arguing that "gaming's cruel optimism exploits minority gamers fierce attachment to the medium and sutures it to a notion of social justice that can only be earned, not given."[27] Gaming and the way it is designed tilts the playing field toward those in power, and patterns of optimization tend to reinforce dominant power structures. Centralization of theorycraft as an expectation positions players in tension with each other. Players need to demonstrate they can play the game and also must show off both their capacity and knowledge of how the game works and how it should be interpreted and played by all. Those who theorycraft are right, good, and best. Those who do not theorycraft or are not on top of the latest findings are lesser, bad, and wasteful. Within the context of a multiplayer game, these kinds of presumptions make some players more valuable and worthy than others. People want to add others to their group who are fluent in theorycrafting and will turn away those who are not knowledgeable, who are least able to learn, or who do not adhere to key tenets quickly.

To understand what is happening in a game, players often use theorycrafting as a way to sort through players and strategies. The centralization of mathematics and overarching algorithmic bias makes analytics seem like a no-lose approach in an effort to min/max one's way to success. However, there are notable impacts to pursuing optimization. There are substantive stakes as players enforce norms on each other, as they end up building a self-reinforcing hierarchy in praise of theorycrafting while marginalizing those who would deign to choose an alternate path.

Where Theorycrafting Leaves Play

The search for an optimal approach is one way to consider a game different from play. Play can be recreational and exploratory rather than scripted and

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efficient. Optimization displaces the suboptimal and the uncertain in favor of using experiments to settle on a best. Surely in the process of developing theorycraft for a game there is plenty of time to pursue flights of fancy and different approaches to the game, but that is all in an effort to find an answer and then relentlessly pursue the best way of doing things until one needs to find a new optimal approach. The pursuit of a meta shifts play, undercutting and changing it as the game congeals around a script. As Reimer puts it, "a solely quantitative understanding of theorycrafting strips surprise from the experience, replaces exploration with domination, and substitutes perfecting mechanical execution for revelry."

He continues by noting the impact optimization has on players, as they "need no longer make choices about how to allocate items, ability points, or team members, and can instead focus on simply playing 'better' than other players."[28] Play is squashed and homogenized as players "know" the best way of doing things, and their movements in the game are more about proper execution and following a script than anything else. Players are reduced to pushing buttons in a given order, wondering when they got out of their casting sequence or if they will need to move to dodge an obstacle. The pursuit of theorycrafting replaces exploration and play with certainty and procedure, restructuring interactions within games.

Another way of thinking about where theorycrafting leaves a game is to focus on the rules of a game and how it works. Perhaps best seen in sports, where players routinely find the edges of certain rules before leagues change them to address any unwanted effects, optimization can be seen as mining the rules to find where they can be bent or broken. In an essay about how players seek an upper hand in games, Torill E. Mortensen recasts theorycrafting, writing that it "also can be called 'rule mining', from the way the rules are searched for and brought out from behind the user interface through a large set of methods, in the light of gaming as a learning strategy."[29] In this sense, Mortensen redefines theorycrafting and play as part of learning. If one thinks of optimization as mining, the rules can be a fun, exploratory process, finding the edges of the acceptable and pushing for a previously unseen edge. Instead of a process of hierarchy and certainty, this idea of optimization seems more connected to play, exploration, and learning.

However, this conception of theorycraft also leaves out what happens after the rules have been mined and the edges have been found. The process

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of theorycrafting is often far more playful than what happens with it after the optimal is exercised in practice over and over again. This is a central tension of optimization. The initial exploration to find the boundaries is invigorating and can expand play. The tragedy does not kick in until players figure out what is "right" and the endless repetition ensues.

Embracing the idea of metagaming as rule mining can help to reconceptualize what a practice like theorycraft is doing. Instead of focusing on finding and executing what is considered to be optimal on a wide scale, it is possible to imagine those theorycrafting into a role as a trickster seeking to cross boundaries and create cultures. In categorizing types of players, Liam Mitchell argues for the categorization of theorycrafting players as triflers, tying them to cheats and spoilsports who "relate differently to rules and goals, but they share a common ability to destabilize gameworlds. And while cheats and spoilsports can 'collapse' or 'shatter' those worlds through their disregard for rules and goals, particularly when the disregard take the antisocial form of counterplay, the rule-abiding triflers also act as forces of destabilization, though of a different kind. When rules are bent enough, they may be as good as broken."[30]

Theorycrafters abide by the rules of the game, but they seek the limits of what exists, finding an edge where others may not see one and thus destabilizing the balance originally intended by designers. Mitchell argues that these boundary-crossing players are like the mythical tricksters who have a similar role, treading where others do not dare and redefining how things will be done in their wake. Triflers shift play, altering it and engaging in a dance between those making the rules and those pushing them to their very limit.

Theorycraft gives and takes about as much as players let it. Seemingly a pursuit of optimization that can make them better, it is also a poisoned chalice that can solidify a hierarchy among players and push them to marginalize those who disagree with key beliefs or who simply want to explore and play for fun. Reimer calls for a different way to think about theorycrafting, arguing that issues arise with the kind of optimization that is pursued as quantitative optimization often displaces the informal, qualitative, exploratory play that can also be part of theorycraft.[31] Thinking broadly and flexibly about what can be while balancing against the establishment of clear answers and approaches offers a path to a more playful optimization. A more inclusive and varied optimization may yet retain the ability to

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be successful and also addresses patterns of domination and common pool resource problems that come into play when a large group of players seek a singular approach to games. Optimization can end play, but it can also be a springboard for a different kind of play when players who theorycraft and game designers acknowledge its contingencies and make space for a variety of approaches.

With a general grounding of what theorycrafting is and how it impacts play, it is possible to turn to a focus on a series of games to understand how theorycrafting plays out in those communities and, ultimately, how the practice in those games informs how to design games in a way that best serves all players by disrupting problematic patterns of behavior. Solving the common pool resource problem that can stem from a broad quest for optimization offers a route to redesigning games and restructuring communities around them to embrace many different kinds of play while allowing those who like to win to keep chasing that sweet theorycrafting high.

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2 *Overwatch*

Released to great fanfare by Blizzard Entertainment on May 24, 2016, *Overwatch* is a team-based shooter made out of the ashes of their Titan project, which was canceled in 2014. Titan was being built in the wake of the massive success of *World of Warcraft*, which gave Blizzard plenty of resources to work on a new intellectual property. The design of *World of Warcraft* also informed Titan since it was intended to be a massively multiplayer online shooter. However, according to leaders at Blizzard, they were unable to find the fun in the game and did not want to break the trust they had with players for producing quality content, so the game was shuttered.[1]

When Titan shut down, the team of 140 was mostly moved to other projects, but 40 remained with the goal of spending two weeks to come up with another concept for a game. Sticking with the intent of developing a shooter and reflecting on the competition in the market, Blizzard sought to produce something optimistic and hopeful.[2] Most other shooters, like *Call of Duty* and *Battlefield*, are set within historical battles or dystopian futures. They tend to center grizzled men who seek out victory in battle with guns, guns, and more guns. The original *Overwatch* was brighter and much more colorful; the cover character for the game is a smirking woman with bright orange pants. That character, Tracer, would later be revealed as gay, in line with a general desire to build the game around "positivity and inclusiveness."[3]

Reflecting on the developer's words about inclusivity is also the point where it is incredibly important to note the limitations of this sunny, open, inclusiveness. *Overwatch* did not include a black woman for years, waiting to debut Sojourn until 2022 in *Overwatch 2*, even after the character appeared briefly in the second ever animated short in 2016.[4] The alternate

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skins in the game have often been highly problematic, with some being racially insensitive at best, others appropriating culture in troubling ways, and at least one engaging in a problematic representation of mental illness.[5] As Shahryar Rizvi argues, there are deep problems in the alternate skins, many of which are examples of "traits from different groups [being] thrown together without regard for their origin."[6]

In 2022, Eric Alt posted about the Diversity Space Tool that Blizzard used to inform decision about character design and inclusion with the goal of clearly delineating "between token characters and true representation."[7] The announcement was quickly and widely ridiculed for trying to quantify diversity and inclusion as opposed to engaging in deep, qualitative reflection. Notable given the topic of this book, an excellent response by Jeffrey Rousseau noted that "Activision Blizzard wants to min-max its DEI [diversity, equity, and inclusion] stats."[8] In this context of a company that both wants to create something optimistic and inclusive but executes those goals in problematic ways, there were also deep problems beyond the specific efforts of inclusivity in games. Investigations revealed massive misconduct at Activision Blizzard stretching over many years, leading to government investigations about the treatment of women at the company and an $18 million settlement with the US government in 2021.[9]

This is the crucible in which *Overwatch* was formed. A project failed and was redesigned. Instead of a wholly new kind of game genre, the mechanics were reimaginations of existing shooter games with a push toward quick, bright, positive play and stories. Yet, there was frequently a gap in the execution of that overarching goal, including in how employees were treated at the company.

Overwatch: The Game

Overwatch is a team-based shooter with six players on each side.[10] At launch, the game came with twenty-one characters, and more were added over time.[11] In the interests of developing a new franchise, there is a rich backstory to *Overwatch*'s world that plays out in the game, in comics, and in short videos produced by Blizzard. Set sixty years in the future, the game occurs in the fallout from the Omnic Crisis, where the robots that had fueled a human golden age attacked humankind. The robot uprising led the United Nations to create Overwatch, an international coalition of superpowered

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fighters who could take on the Omnics. Overwatch stopped the uprising, but tensions between its leaders led to a collapse, and the United Nations disbanded Overwatch. The game play takes place six years after Overwatch was forcibly broken up, as the gorilla and former Overwatch member Winston stealthily gathers former members and new recruits together to battle against corporate takeovers, terrorism, and a possible second Omnic Crisis. Characters in the game are divided between nominal forces of good, those being brought together by Winston, and those seeking to undercut the social order, like the former leader turned bad guy, Reaper.

The game play is centered around teamwork as players are charged with working together to accomplish key objectives in various game modes and maps. There were seven core modes in the game at launch. Assault sets an attacking team against a defensive team, and the attackers need to capture a pair of points before time runs out. Control features both teams trying to hold an area of the map and get to 100 percent control in a best two out of three format. In escort, one team tries to get the payload from one point to another on the map, while the other team seeks to stop them. Each stop in escort leads to more time added to the task, giving the escorting team a chance to go farther. Hybrid blends assault and escort, using both a capture point and a section where players must escort a payload. Capture the flag tasks players with capturing the opponent's flag while defending their own. The first team to three captures or the team with the most at the end of five minutes wins.

Players can also opt for deathmatch or team deathmatch, where the only thing that matters is killing other characters/characters on the other team. Elimination is similar to deathmatch, but characters do not respawn and the game is played to three wins in team mode and five wins in one versus one mode. Additional themed modes were added over time, like Junkenstein's Revenge in the lead up to Halloween and Mei's Snowball Offensive around winter holidays and the New Year. The themed modes tend to be available only for a limited time and typically feature quite different game mechanics. Junkenstein's Revenge is a cooperative battle against computer-controlled foes, while Mei's Snowball Offensive is a large, six characters a side snowball fight.

Within the various normal game modes, there are a couple of distinguishing features to the game play in *Overwatch*: ultimate abilities and overtime. Ultimate abilities, or ults, are compliments to a character's regular

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abilities. Ults are charged both over time and based on activity in the game, like doing damage or healing characters. An ultimate ability can turn the tide of battle and is often best used in conjunction with teammates to do something devastating to the other team. Excellent teams work together to coordinate how their ults are charged and used throughout a match. Ultimate abilities mix up game play, regularly providing dramatic moments where the momentum of a battle can turn, but the fact that they need to charge means that they cannot be used too often. Because they also charge based on activity within the game, they tend to reward the side that is doing better, giving additional reasons to work together and stay in the fight.

Overtime was added in an early patch to the game, extending battles based on last second activity. When an attacking player is on an objective as the timer is running out in a mode like assault, overtime mode begins. As long as an attacking player is contesting the objective, the game will continue, but if the attacker is defeated or moves away from the checkpoint, the timer will begin ticking down. If the timer runs out, the defenders win the round. The timer decays at the same rate for the beginning of overtime, but after twenty seconds, the depletion rate gets faster, forcing the game toward a conclusion. To make it more likely that overtime rewards the more successful team, respawn times are increased, putting a premium on both staying alive and defeating one's foes. The addition of overtime makes the end of matches more exciting as attackers have one last chance to succeed and defenders are forced to hold on for a few more seconds to clinch the win. Should the attackers take the point before the timer runs out, the game continues, or if the point is the last one on the map, the attacking side is victorious.

Ultimate abilities and overtime make *Overwatch* play dynamic, mixing up the standard back and forth of battle. They are accompanied by sound and graphics to make these moments more cinematic, heightening tension and excitement. They are particularly well suited for the esports scene as they make for great broadcasting moments and reward teams who work together smoothly. The joint use of ults to upend a critical battle or a tense moment during overtime are great for broadcast during a match and also produces excellent clips to show the dynamism of a top-notch *Overwatch* fight.

The meta in *Overwatch* is particularly well suited for analysis. Coming in the wake of *World of Warcraft*, there were plenty of people who quickly moved to analyze the game and find the best team compositions and strategies. Because Blizzard published the game, it got a ton of attention, leading

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to lengthy debates online and plenty of material to represent the emerging and changing contexts of theorycrafting in *Overwatch*. Pulling from that online discussion makes it possible to reconstruct what players thought about the game and how various metas were impacted by the game's design and how they either drew people in or pushed them away.

Additionally, a key reason to analyze *Overwatch* is the once vibrant pro scene for the game, particularly seen in the launch of the Overwatch League (OWL). OWL was heavily backed by Blizzard, and the first season was sponsored by Twitch. It featured franchises that were tied to cities around the world and had nicknames, much like traditional sports leagues. Each of the twelve franchises that started OWL paid a franchise fee of $20 million, which escalated in advance of season two to a reported $30–$60 million.[12] The fees far outstripped start-up costs in other esports leagues, and franchises were often tied to ownership groups that had traditional sports teams as part of their portfolio. OWL was hailed as a huge leap forward for the mainstream appeal of esports, and it was a key part of the overall development strategy for *Overwatch*.

Esports offers another way to reflect on the meta as the competition driven by the money at stake sharpens and shifts the importance of finding the most effective approaches to play. Professional esports play is similar to the high-end guilds that led theorycrafting discussions in *World of Warcraft*, but it is also quite different. In the case of *World of Warcraft* the best guilds in the world often had sponsors, but those groups were few and far between. Some of the guilds seeking world firsts were tied to esports organizations, but there was not an explicit, sponsored competition between guilds. Guilds in *World of Warcraft* raced each other, but they were functionally fighting against the game. In *Overwatch*, teams directly battling each other, wins and losses are tracked much like traditional sports, and live broadcasting makes their work visible to all instead of being relegated to a screenshot of a victory alongside an announcement of victory in a new *World of Warcraft* raid battle.

Optimizing *Overwatch*

The arc of the meta in *Overwatch* can be tracked through a series of emergent strategies and the developer responses to changes in the game. The most effective tactic available in *Overwatch* changed over time but could

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largely be traced to the characters who were used at any given moment. As a six versus six team-based game with thirty-two playable characters as of this writing, the choices made to build a team are pivotal to how a battle will go. Optimizing *Overwatch* largely comes down to picking the right composition of characters and then putting each of them in a position to succeed within the battle. There are several key moments in the evolution of the meta within *Overwatch*, but a little bit of background leads to the most impactful moment in the game: the rise of GOATS.

Discussion of the *Overwatch* meta is important enough that Sam Putney, a journalist focused on *Overwatch* and esports, spent about three months posting a nineteen-part "comprehensive history of *Overwatch* metas" in late 2019 and early 2020.[13] Inspired by the fact that OWL was drawing more people to *Overwatch* esports, Putney sought to disabuse people of the idea that the meta in professional-level *Overwatch* play had always been stable. Putney traced the three years of various metas leading up to the launch of season 3 of OWL.[14] Although the beta "was horribly balanced for a professional level of play," Blizzard began adjusting the game with professional play in mind very early in the game's life, pinning the game design philosophy down and shifting how *Overwatch* would be played by all.[15]

After launch, the game settled in until the first balance patch, which came about two months later. The patch on July 19, 2016 added the first new character, Ana, a support character who could heal, do damage, and also put foes to sleep. Putney argues that "one could make a very strong argument in favor of this being the most important patch in *Overwatch* history."[16] The reason why the patch was so important is that it rebalanced over a third of the characters in the game and led to the development of the early "dive" meta. As teams choose their group of six characters, they select from characters with three primary roles: tank, damage, and support. Tanks work to absorb damage, getting in the way of the opponent and stopping them from killing the damage, and they support players who typically have less health. Damage dealers are charged with laying waste to their opponents but need to watch out as they cannot withstand much damage. Supports typically have some sort of healing ability but can also be focused on doing something to either elevate the play of their teammates or inhibit the efforts of their opponents. A dive meta is based on getting past the opponent's tanks and taking out their support and then damage dealers. Without support, the other team cannot heal. Chipping away at

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their damage makes them far less dangerous. And without support or damage characters, the tanks cannot do much on their own.

This July 2016 meta came together around a handful of characters. For tanks, players were generally picking from Reinhardt, Zarya, or Winston. Damage choices were among Genji, Tracer, McCree, and Reaper.[17] And for support, the picks were almost always Zenyatta and Lucio. Even in the midst of 22 choices, only 9 characters were frequently used. As Putney puts it, "And that was it. Almost no other heroes were played. At all."[18] This is one of the clear impacts of a developing meta. When players sort out the best choices for a given situation, they choose them and leave the less optimal pieces behind. Top-level *Overwatch* players were effectively only playing with a third of the roster, and the two support characters were the same on virtually every team. Even more strikingly, a buff to Zenyatta made him the focus of play. As Putney writes, "These dive comps focused less on verticality and more on just grouping up and smashing your way into the other teams [sic] backline. The whole goal was kill the Zen[yatta]. Without a Zen, the other team would often fall apart."[19] One of Zenyatta's key abilities is the discord orb, which amplifies the damage taken by an opponent. Zenyatta tossed the orb at the target, damage dealers unloaded, and, when executed properly, the other team fell apart.

The limited number of choices in building an optimal team structured this period of high-level play. Putney writes that "this meta was not a whole lot of fun to play the game in. Zen essentially being a must pick, and the meta was fairly set in stone turned a lot of players off. So was this meta bad from the pro scene? Not at all. This was one of the best meta's [sic] to watch, due to the immense amount of high-skilled heroes and non-stop action that was taking place."[20] This points to another tension in questions of optimization that is highlighted in cases where viewership is a significant factor: what is good for players and what is enjoyable to watch can be two very different things. For players, this meta was limited, with few choices and repetitive game play. The strategies were predictable and similar; what mattered was the level of execution of those strategies. For viewers, the knowledge of what was going to happen simplified aspects of tracking battles. It was easier to get to know the limited roster of characters actually being used, and the strategies were easy to follow.

There were also super exciting team battles to watch or clip for social media. Typically, both teams employed similar approaches, and the battle

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of skill was compelling. As an esport with key support from its game developer, the tension between what is good for players and what is best for viewers is at the center of how to design *Overwatch* and address emergent metas. This conundrum about the intended audience of *Overwatch* was at the heart of the meta that fundamentally changed *Overwatch*: GOATS.

In the wake of the dominance of the dive meta, Blizzard announced the release of a new hero, Brigitte, who came with "an array of powerful anti-dive elements."[21] In the North American Open Division season 2, an unsponsored team that went by the name GOATS won and backed it up with a win in another tournament, and suddenly a third-tier competitive team was unexpectedly beating more highly ranked teams and radically reshaping the game. The strategy they used was to drop the damage dealers and focus on using three tanks and three supports, including the newly released Brigitte.[22] As Karl Bray put it, "the GOATS team wasn't particularly talented, and their triple tank/triple healer comp wasn't particularly innovative, but it was played with such coordination and such hyper-aggression that it devastated opponents and quickly gained notoriety as a low-skill/high-reward strategy."[23]

Although other teams had used similar approaches in small doses, the GOATS six-player lineup of Moira, Lucio, Brigitte, Reinhardt, Zarya, and d.va began to dominate the game. Brigitte helped the team survive the dive meta, as the team could withstand an initial assault and then slowly grind down their opponents. As Nathan Grayson wrote, "The core strategy underlying GOATS is one of attrition: a team made up of tanks and area-of-effect-focused healers smashes itself against the enemy team until one of them breaks. . . . Players dislike it because it's both straightforward and limiting; the best way to beat it is to either mirror it or run a highly specific counter-composition."[24] In an analysis of GOATS versus dive, Daebakowl argued that the approach "highlighted the loopholes within the game. The players were able to think outside the box to find the meta that broke the formula. . . . It defined that the game was really the players' game as they used heroes in ways the devs [developers] may not have thought of or wanted them to be played."[25] GOATS shifted play, centering a nontraditional approach and even further limiting options. As GOATS took hold in the OWL in stage one of season 2, the five characters that made up the core of GOATS all saw usage rates above 83 percent, with the sixth just under 70 percent and sixteen characters at 5 percent or less.[26] The game

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was calcifying around a limited number of characters, much like it had in the early dive meta. The difference between GOATS and the dive was that GOATS was also terrible to watch.

GOATS does have a certain kind of charm to it. It is a brilliant resistance to what was dominant at the time and a clever way to deploy resources in a competitive game. But it did not make for edge of one's seat viewing. GOATS spread across all levels of *Overwatch* play, sometimes with slight variations and tweaks, but the preeminence of the strategy combined with the fact that it took less obvious skill than many damage-reliant approaches eroded the practical choices available in the game, decreasing how compelling *Overwatch* was to watch. As Karl Bray explained, "as the meta took hold, matches descended into Mirror GOATS, where both teams lined out with identical composition. From an esports fan's point of view, there's one problem. GOATS is not pretty. If *Overwatch*'s 'dive meta' was a leopard skilfully [sic] pouncing on a wayward gazelle, the 'mirror GOATS' meta is two river hippos wrestling for the last puddle of mud."[27] Cecilia D'Anastasio put it slightly differently, pointing out that a mirror GOATS battle begins to look more like a multiplayer online battle arena game, like *League of Legends*, rather than the shooter that *Overwatch* was supposed to be. D'Anastasio notes that "watching the Overwatch League over the last couple of months has been like watching a completely different game from Blizzard's massively successful first-person hero shooter."[28] This meant that casters, the announcers who narrate what is happening in a match, had far more work to do to explain the action.

To D'Anastasio, the focus on tanks rather than on damage dealers meant key moments of the game were "much less thrilling from tanks' perspective than they are from high-level damage-dealers'—and I say this as somebody who mains tank myself. When some of the most commonly chosen heroes fight with blunt-force hammers and shields, GOATS' one-on-one skirmishes aren't much more exciting than a couple of kids playing tug of war."[29] Needless to say, the idea that their flagship esports titles was turning into a different kind of game and was not compelling to watch was cause for alarm at Blizzard. Subsequent patches to the game attempted to erode the dominance of GOATS. Key characters' powers were lessened, and new characters were introduced, but the stagnant meta of the game had a substantial impact on *Overwatch*. Given this high-level view of GOATS and why its rise was a pivotal point in the history of the game, it is important

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to turn to a general discussion of the meta in *Overwatch* before finishing the story of GOATS.

Metas are tricky things. As they get established, they can push people away from the game as some fully embrace the search for the optimal and others do not like their options limited or their choices dictated to them. As Luke Plunkett reflects on his own play, "'meta' is a word that casts a long shadow. It's actually the reason I stopped playing *Overwatch*, years ago now, because as a casual player I just couldn't stand everybody continuously talking about it, or trying to be a part of it, instead of just hanging out and enjoying the game."[30] The stability of any meta is a problem in *Overwatch*, particularly one that players did not particularly enjoy and is not viewer friendly. Establishing a meta in a game can push casual players away since those who just want to play cannot avoid it, leaving them subject to either the tyranny of optimization or opting out of the game altogether.

The tension between what players want and what is best for the game was prominent in discussions about what to do with GOATS and how to address the clearly dominant strategy. In January 2019 Nathan Grayson wrote an article commenting on a discussion *Overwatch* game director Jeff Kaplan had with a streamer, writing that "the calcification of the meta is no joke for Blizzard. Despite cries for a shake-up to the meta, it's not something the development team can just change willy-nilly."[31] The risk for Blizzard is that all of their actions could lead to more problems. Grayson quotes Kaplan as saying that "players will always want to play optimally," a belief that left Blizzard with a handful of choices and eliminated any attempt to try to shift the culture of games to address the problem. Grayson used Kaplan's argument to come up with three answers to how to address GOATS: an arbitrary system to force a change, rebalancing the game with buffs and nerfs in an attempt to make GOATS less powerful relative to other choices, or hoping that players figure something out that counters GOATS.[32] At this point in the arc of GOATS, Blizzard largely opted for the middle approach, making changes to the game with the hope of facilitating a better chance for players to find an answer with a bit of a push. These subtle shifts and nudges did not work, leaving Kaplan to ponder how to finally shift the meta of the game.

Later, in summer 2019, Blizzard announced a major change to the game to address the prominence of GOATS. After numerous patches and adjustments, Blizzard introduced a 2-2-2 role lock. After the change, GOATS

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simply was not possible as all teams had to have two damage dealing characters and could only use two tank and support characters. Effectively, Kaplan and the team got to the point where the arbitrary system was the only answer to addressing what GOATS had wrought. In a reflection a year later, Bradley Long wrote that the change was "a win for the casual player" as it made their games more streamlined and dynamic. Players no longer had to jostle for roles and find that random teammates did not want to fill necessary positions as they could queue up with their intended playstyle in mind.[33] However, the impact on the professional side was less positive, as "the number of possible team compositions decreased by an order of magnitude. While the added restrictions were useful to help casual players find a workable comp[osition] on the fly, for dedicated teams, they only closed off possibilities."[34] The change radically restructured the game and was cited as a key reason why 2019 OWL most valuable player (MVP) Jay "Sinatraa" Won retired from *Overwatch* in the middle of the 2020 season to play *Valorant* instead.

Months after the implementation of role locking and the introduction of "hero pools," which banned a selection of four heroes each week, Nathan Grayson wrote that, at the professional level, the changes "produced uneven performances from teams and led fans to wonder why Blizzard didn't go with a more traditional match-by-match pick/ban system instead."[35] The attempt to please both professionals and recreational players and the need to move to a blunt force solution framed the limitations of the game as the meta once again put recreational and professional play in tension. The interests and desires of pros and more typical players would likely be better served by different answers, and a static meta exacerbated the strain, especially when also considering that professional *Overwatch* also needed to produce compelling viewing. The role-lock structure stamped out GOATS and helped players at most skill levels, but professional players have different incentives, and the brute force solution led to substantial discontent on the pro scene.

In January 2020, a few months after ending the GOATS meta via role locking, an article by Grayson commented on a new developer video released by Kaplan about the meta and the future direction of *Overwatch*. Grayson began from the premise that "by this point, I would imagine that *Overwatch* director Jeff Kaplan is sick of talking about the meta. It's a perennial topic among vocal portions of the *Overwatch* community and a near-constant

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source of consternation."[36] He writes that *Overwatch* has "faced criticism for a slow-moving meta" and builds to the discussion of more player testing of any changes and an accompanying "change in overall balance philosophy. Previously said Kaplan, the team focused on 'stability' within the ranks. Now, however, they're going to 'specifically' target the meta 'more frequently, more aggressively.' The goal will be to move players 'off the meta as frequently as possible.' If a series of balance changes prove themselves overly egregious, Kaplan added that the team will not be afraid to revert them 'a few weeks later.'"[37] Grayson pointed out that this was a massive change in the design trajectory of *Overwatch*, in tension with previous claims that most players were not affected by the meta and players would hate the meta regardless of what it is. Centering development resources on establishing a fluid meta stood to impact all players quite often and ran the risk of pushing players away as the game kept changing and they had to relearn what they once knew.

Central design elements of *Overwatch* have a dramatic impact on how metas form and perpetuate themselves over time. Unlike a game like *League of Legends* that often begins with players picking and banning certain players from the match, *Overwatch* characters can be changed on the fly, and for most of the run of the game, all characters could be chosen by all players. This fluid ability to change characters means that one team can mirror the other's composition throughout the contest, which Sam O'Dwyer notes meant that "the two teams often end up mirroring each other as the only way to match their opponent."[38] O'Dwyer builds from this initial analysis of *Overwatch*'s design to make the case that because teams can mimic each other on the fly, "Blizzard has had to forcibly extinguish Metas in the past. Between each one of these Blizzard interventions, long-lasting Metas have formed and quickly made the game feel repetitive and stale."[39] The need for a brute force solution and the original design idea of seeking stability in the game can lead to staleness, something that O'Dwyer argues has only really been well addressed in the game through the addition of new characters.

Moreover, detailing the impacts the additions of characters like Ana, Sombra, and Brigitte had on the game, O'Dwyer contends "Ideally, Blizzard could increase the rate in which heroes are introduced to the game to ensure that Metas do not become stagnant and boring for too long. This is much more natural than having to nerf characters after months of complaints that a Meta has become stale and unbeatable."[40] O'Dwyer also immediately

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followed this sentiment up with the observation that it is likely quite hard to produce new content and characters at a rate that would satisfy the community. From the art to the design to the testing, getting a new character into *Overwatch* is quite the endeavor, but it is one of the few things that regularly mixes up the balance of the game without a brute force approach rule change or a massive buff or nerf to an existing character's effectiveness. Without new characters, as the meta stagnates, Blizzard has limited options to evolve their game and keep players on their toes.

The meta in *Overwatch* is structured around three key balancing points: the needs of mainstream players, the needs of professional players, and the need of OWL to create a compelling product for broadcast. Over the run of the game, Nathan Grayson and Cecilia D'Anastasio argue that the game became more rigid, in part because "design decisions have done a lot to support this" with "role locking, role queuing, an endorsement system, a group finder, and a more robust player reporting system."[41] They argue that the changes are largely beneficial to typical players and the OWL product has been good, but the meta in professional play has stagnated too often.

Too much change can be a problem, however. Although fans may want the meta to break and force teams to find out what is optimal on the fly, Nathan Grayson argued that if the results in professional play are too random, "it's harder to feel invested in these unexpected upsets."[42] The dynamic professional and recreational scenes bleed into each other, as game director Jeff Kaplan writes "As a team, we agree with and understand that players want the meta to be more fluid and move more frequently. Even though the vast majority of players only experience the meta through OWL, feedback from GM's, streamers and YouTubers, we get that the perception of a stale meta is not good for the game. We absolutely have plans to help move the meta more and we'll be talking about these in an upcoming developer update. We get it. We agree. Make the meta move faster. Ok."[43] While conceding that the development team is going to take the tip from players to keep the meta from getting too firmly established, it is quite notable that Kaplan was arguing that players do not really experience the meta in their play. Instead, they see the meta in professional play and represented in media coverage and streaming about *Overwatch*. Effectively, the presence of a pro circuit and substantial online discussion about the *Overwatch* meta speaks it into being for many. Through Kaplan's eyes, the meta is not really a problem for recreational players; they just hear and echo the critiques of others.

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As *Overwatch* wound down and *Overwatch 2* stepped up to take its place, key changes were being made to how the game worked. Instead of six players on a team, the game featured five. This effectively took one of the tanks out of the action as the five were composed of a tank, two supports, and two damage dealers. John Mudd argues that the changes to tanks run deeper, as "the current design philosophy for *Overwatch 2*'s tanks is to shift them away from being an impenetrable wall and more toward being brawlers."[44] It is hard not to see these changes as a belated structural reaction to what GOATS did to the game. Taking a tank out of the game would likely lead to less risk of the battles looking like hippos wrestling over a puddle of mud. However, the change also meant that teams in the OWL needed to be reconstituted to adjust for the fact that one of the six who used to be on the team was pushed out of the main lineup.

For those who specialized in a secondary tank role, the change was even more dramatic as it eliminated their job altogether. As Ash Parrish notes, "Reducing the number of tanks from two to one will effectively eliminate the role of off-tank, meaning players in that role could lose their positions."[45] The initial meta in *Overwatch 2* was incredibly fixed, or "stale," as five heroes were picked over in over ninety percent of games and no other hero exceeded the ten percent mark. By season 3 the meta had diversified somewhat, settling into a brawl approach where teams mostly fought in close-quarters combat. As the new version of the game settled in Agilio Macabasco hailed changes to the game and pronounced in April 2023 that "this season is one of the most balanced yet and there is a lot of diversity based on map and ranked level."[46]

It is also important to keep in mind, however, that all changes in a game like *Overwatch* are ultimately related. In anticipation of the release of *Overwatch 2* and without the knowledge of what would come, Mudd argues that "even though at first it may appear that *Overwatch* shifting toward five-person teams is a minor change. . . . Everything in *Overwatch* fits together like a puzzle, so changing one piece, no matter how significant, will cause everything else to shift around it."[47] The game will continue to flex and bend, but the ramifications of any change ripple throughout the game, impacting professional and recreational play as well as what the game looks like on streams. Unlike Kaplan's contention that recreational players are not impacted by the meta, optimization comes for all of us.

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Overwatch and the Meta

The need to make the game suit so many different contexts gives a meta in *Overwatch* outsized power as it really only needed to negatively impact one of the three key constituencies to cause a problem. For professional players, consistency and flexibility are keys so that they can show off what they are capable of, even if it is a map exploit that the OWL quickly stamped out.[48] For recreational players, limiting choices can actually be a good thing as they are freed up to focus on what they do well and can be placed in a structure that encourages them to cooperate. On streams, the action needs to be dynamic and compelling, but the audience also needs to be able to make sense of what is happening. If the game play is too different than what recreational players can comprehend, there is a lot more work to do to explain the professional form of the game.

The varied needs of these three interest groups are at the core of the common pool resource problem of *Overwatch*. Akin to the classic contractor problem of you can have a renovation cheap, fast, or of high quality but you can only pick two, the meta in *Overwatch* puts the three audiences in constant conflict. Public statements from Blizzard employees make it clear that they understand aspects of these tensions, but they also have a difficult balancing act and likely are not all in alignment given their different positions in the company. It is understandable that those more closely tied to the OWL may have quite different interests than those in charge of core game design. The meta and the desire to optimize play is at the center of this problem as what is optimal for a recreational player is quite different than what a professional player can execute. As the meta congeals at the professional level, recreational players can watch what is happening at the pro level and have plenty of places online to debate its relative merits. When that happens, players can take what they learn from professional play and may seek to apply it in their efforts even if they are not as skilled. This cycle is likely to lead to dissatisfaction over time, especially when the meta congeals and lasts, foreclosing the number of interesting choices left in the game. As those choices get limited based on players' perceptions, interactions within the game are changed and players may use tier lists and strategic approaches in line with what others consider best instead of seeking their own knowledge in exploratory, qualitative play.

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Optimizing *Overwatch* is complicated, but there are tons of opinions about the best way to play. Largely organized around periodic metas, the fallout from the year-plus-long GOATS meta demonstrates how the idea of optimization, of theorycraft, can limit and negatively impact a game. When GOATS effectively solved the game, *Overwatch* got flatter, less interesting, and far more limiting. Fewer choices were practically available to players as the ideal team compositions became established as fact. Blizzard sought to disrupt the meta through small changes but had to resort to a blunt force series of rule changes as the game had been "solved." Role locking and character restrictions generally made the game better but had a substantially negative impact on professional play. Keeping all the plates spinning for a game that seeks to be recreationally interesting, professionally compelling, and worthy of multimillion dollar franchise fees is quite difficult because what is optimal for any one of those things likely is not optimal for all of them. However, lessons can be found in another realm trying to balance varied interests of multiple audiences: professional sports.

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3 Baseball as the Tic-Tac-Toe of Sports

Years before the idea of theorycrafting took off, sports analytics began to find its roots. Largely dated to Bill James's analysis of baseball, including *The Bill James Baseball Abstract* that was first published in 1977, sports analytics grew from a frequently mocked fringe pursuit into the backbone of organizational and decision-making strategies for multibillion-dollar sports franchises. Starting with baseball, analytics stretched into the fabric of almost every sport, with money poured into efforts to find the hidden rules, to develop the theorycraft, that would help one team win at the expense of another. In the most basic sense, sports analytics are an attempt to develop a meta for a given sport. Boundaries are pushed, assumptions are questioned, data is collected, and models are run, all in an effort to make the team perform more effectively.

In the wake of work by James and many others, analytics has changed how baseball is played. There has been a sea change in which players are the most valuable, how to use the players a team has, how to position defenders, and a general overhaul of what a game looks like in practice. However, that is not the only reason to start an analysis of sport and optimization by looking at baseball. The primary reason why baseball is especially notable is that it works differently than many other sports. Baseball is largely a game of discrete events, where the defending players have a chance to get set before every pitch, where the pitcher can set up and make the pitch they want, and eventually where the batter will try to hit the ball. And after each of these events, the players will reset and repeat the process over and over.

These discrete, clear events can be readily measured and assessed unlike the fluid back and forth of other sports that dramatically complicate data gathering. Add in the number of games played, as a typical Major League Baseball (MLB) regular season has 162 games, which is about four times as

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many as top soccer leagues and almost ten times as many as the National Football League, and the statistics that are generated are more reliable as they are less likely to be influenced by short-run outliers. The combination of the discrete events, the history and amount of data tracking in the sport, and the presence of a medium- to long-term season has made baseball closer to solved than any other sport I know of. In a way, I would argue baseball is becoming the tic-tac-toe of sports and that path is worth exploring in an effort to understand how optimization impacts game design.

Foundational baseball analyst Bill James developed a new way of thinking about the sport by focusing on how data analysis facilitated a fundamentally different understanding of the game. Throughout his early work, James was hampered by the lack of reliable information about the games in MLB. Any sort of data analytics is limited by the quality of the input available to be analyzed, so James and others lobbied to create more accurate, reliable information about what was happening on the field. Eventually, the efforts led to a series of innovations in data collection and tracking that fueled the ability to create new analysis to better understand baseball and develop the most effective strategies to win the game.

James's work was celebrated in the Michael Lewis book, and subsequent film, *Moneyball*.[1] The book focused on Oakland Athletics general manager Billy Beane, who sought to apply concepts from James and others to build a more successful team. The general manager's role is typically to build out the sporting side of the organization, focusing on who to draft as players and who to hire as coaches. Based on his team's success and Lewis's profile, Beane became one of the most notable general managers in baseball. He faced a primary obstacle in that his franchise carried a much lower budget than competitors, which meant they could not afford to pay for top talent. Instead, they needed to find players other teams did not appropriately value so that Beane and crew could scoop them up and reap the rewards of their insights rather than overwhelm competitors with their checkbook.

The franchise emphasized statistics like on base percentage, which adds walks to hits, to more accurately judge the players who would score runs and add wins to their season. Although the team never won a championship, they did comparatively better than their contemporaries and did so on a much smaller budget. Beane and his team were able to consistently identify undervalued players, moving from one statistic and strategy to the next to stay ahead of better-resourced teams. Standout players from the A's

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were regularly poached with higher salaries from more affluent franchises after they proved their worth, requiring Beane and company to find a new angle to start their recruitment cycle again.

The attempt to develop a meta for sports is relatively more straightforward in baseball than in other sports. Baseball is dominated by individual interactions and stats that can be clearly tracked. The pitcher and the hitter can be assessed. The result of a hit ball can be tracked as a hit, an out, or a foul ball. Runs are counted and it is possible to figure out who is responsible for creating the run and what role each player played in getting the run. Defense was somewhat slower to be tracked analytically, a theme throughout other sports as well, but increased technology and cameras in MLB stadiums dramatically changed what could be analyzed. Now players are tracked for where they start a play, how fast and how far they run, how fast and accurate their throws are, and how successful they are in comparison to other players. All the data enables a much richer understanding of how players contribute to the game defensively, building out the ability for analysts to establish a fairly clear meta for baseball. Other sports are more complicated as there are fewer stoppages and more moving parts to the game. The interplay among basketball players is more fluid and interrelated. The game rarely stops in soccer, and the movement of any of the twenty-two players on the field impacts the other twenty-one. The contrast of the state of analytics in baseball and other sports offers perspective on how important analytics have become, what they can offer, how they impact sports as a whole, and, eventually, how sports analytics are instructive in assessing the impact of extreme efforts at optimization on games. For now, starting with the tic-tac-toe of baseball sets up space to reflect on the lessons that sports offer for video games.

A core factor in fueling the widespread adoption of analytics in sports is the integration of technology. Although it is fairly straightforward to track all the action in a computer game, as they are ultimately mediated by lines of code and actions within the video game can be dumped into spreadsheets and databases for analysis, sports happen within a framework where the data must be collected before it can be assessed. In line with James's early concerns about the poor state of play-by-play data in baseball, major sports leagues have invested greatly in the integration of technology to assess players and how they interact in games. Baseball pitches are tracked and the results compared with the strike zone to rate umpires. A company

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called Second Spectrum uses technology originally designed to track missiles to map how players move on basketball courts and soccer pitches, enabling comparative analysis about how players defend, run, and generally play the game. Catapult developed a wearable system that tracks how players stress their bodies during practice and games, aiding the ability to determine when players need a rest and when they are likely at the peak of their ability to perform.

Technology has also become a means by which players, teams, and analysts can "directly engage in an active exploration to understand why and how such information may have emerged."[2] The combination of technologies to track sports makes them a bit more like a video game, where every data point is ready to be pulled into analysis. Increasing the data available to analysts creates a feedback loop, where the data can increase understanding to lead to new questions and new technological development in order to continue to refine the meta. Although there is likely to be a point of diminishing returns for both the technology and the analysis, that point will probably come when a sport is solved, which will make it far less interesting to watch and play. Baseball offers up an example of a sport that stands as a largely solved game, as analytics are widely accepted and their lessons frame strategy and play.

Along the road toward solving a sport, data analysis leads to insights that change how certain teams play the game. When those teams overperform, their tactics are copied, frequently changing how the game is played and often upending decades of tradition in establishing a new "best" way to play. In baseball this shows up in defensive shifts where instead of dividing the field equally, defenders align themselves in a manner matched to where the hitter typically strikes the ball. In basketball, the three-point revolution took over as teams recognized that shots worth three points are expected to generate more points than long two-pointers and basically every shot other than those very close to the basket.[3] In soccer, pressing dominates as elite teams noted that being able to win the ball high up the field makes them more likely to score and renders the opposition less likely to get a shot off. Football analytics found what *Madden* players had known for years, which is that going for it more often on fourth down increases offensive production (and is generally more fun).

Throughout these changes, there is a back and forth as analytics debuts some new insight and established norms within the game resist. A strategy

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that is proven to be more effective in the long run does not take hold unless a coach or manager makes it to the long run in the first place by not getting fired. Short-run struggles, especially for those with novel approaches, can quickly leads to questions from the media and fans, potentially ending a career. For a new meta to really get established, it not only has to work, but it has to do so fairly quickly, and then as it spreads, it can become the new set of norms the next insight will have to overcome.

Beyond the limitations in tracking data, analytics in sports are also subject to forces that exist off the field, the personalities, mental states, and interactions among players who structure play. Sports psychology is a rapidly growing field, and plenty of research has been done about successful personality types of players, but nebulous concepts like "team chemistry" have proven harder to assess and predict. It is generally understood that games are not won on spreadsheets, but the mental side of sports consistently undercuts an ability to solve a game with people in it. The human dynamic of games shows up in the fact that record signings for English Premier League teams, the players the team has paid the most money to add to the squad, frequently underperform and struggle.[4] The mental weight that comes with being a record signing, of costing a team that much money, can weigh on players as they attempt to justify the spending, often altering their own playstyle to warrant the expense only to find the adjustment to a new role is much harder than they may have anticipated. In US-based sports, many highly touted draft picks often struggle under the pressure. This is so common in the NBA that those around the sport talk of a "second draft" where teams pick up highly drafted players who failed under weighty expectations on their original team only to thrive in a new role with less pressure.

The mental side of the game also extends into play as some players are considered "clutch" and do better under pressure than others.[5] Although the idea of a clutch player is something that has been validated empirically, other concepts, like the hot hand, where players who have been successful are more likely to stay hot, have mixed results analytically.[6] The ongoing debate about the hot hand demonstrates how many analytical debates, especially those tied to human psychology, remain live questions. People are really hard to analyze, and predicting how people will work together, how they will blend and either exceed the value of their parts or underperform and struggle, presents questions sports analytics are yet to solve.

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The inclusion of people and the level of execution needed for optimal are what keep sports from being fully solved. Unlike the adult playing tic-tac-toe, even sports like baseball have plenty of opportunity for exceptional or error-ridden performance that can overwhelm an optimal strategic approach, particularly in the short run.

A key piece of understanding the backdrop of sports analytics is considering the various incentives for teams in sports. One incentive is winning. Winning is a zero-sum question; there is only one champion or one title holder each year, which places the search for victory at the center of many sporting endeavors. Another incentive is about making money as a club can be run in a manner where the goal is to focus on limiting costs and extracting value out of the club to line the pockets of ownership. If the club is publicly traded, like Manchester United, ownership can directly take money in the form of dividends as part of their ownership stake, directly routing money that could be invested in the team into ownership bank accounts.[7] Owners can also benefit from rising franchise valuations as the limited number of top-level franchises and size of television contracts has meant that the value of teams has skyrocketed and teams can borrow against that equity, sell parts of their ownership stake, or sell the entire franchise and reap the windfall that comes with it.

A third incentive exists more at a league level than for individual teams as the group as a whole has billions of good reasons to create a watchable product. Sports leagues are somewhat funded by gameday revenues and ancillary merchandizing streams, but the largest league-wide investments typically come from television broadcast and streaming rights. Networks and streaming services benefit from the large amounts of viewable products that sports leagues produce. For networks, the sports leagues are especially valuable inventory as games are most frequently watched live, meaning the commercials sold alongside them can often reap greater prices than other programming.

Much like in *Overwatch*, these three broad incentives for teams and leagues are often placed in tension, especially as teams may be pursuing different goals based on their ownership situation and the state of their team at any given moment. In the wake of the Golden State Warriors 2022 NBA title, ESPN reporter Brian Windhorst contended that game 5 of the NBA finals was a checkbook win, as the team was fueled by Andrew Wiggins, a player they were able to obtain and retain because of their willingness

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to pay a massive salary and luxury tax bill. Golden State opted to pursue winning at almost all costs, with ownership selling off equity in the team and moving from Oakland to a new arena in San Francisco to put their best possible team on the court.

Other teams are not always trying to win. Many US-based sports feature a draft where the least successful teams are rewarded with the first chances to select new players, giving teams a direct incentive to perform worse, at least for a while, to do better later. Teams can pursue unattractive styles of play if it suits their interest, which could be about not trying to win or about playing a more physical, ugly game to beat a better opponent. Soccer teams with lesser players may "park the bus" against a more talented team, seeking to defend at all costs to play for a draw rather than a loss. Basketball teams can slow the game down, trying to play with fewer possessions to increase the variance of the game even if the contest is not as aesthetically pleasing. These intersecting interests are similar to the common pool resource problems tied to optimization. It may be in one team's interest to pursue a style or approach, but if every team does the same, the whole group will struggle. The Warriors got added value out of their spending because other teams opted not to spend as much. Teams tanking, losing on purpose, to get the highest draft pick only get the greatest benefits if most teams are trying to win. If every team pursues an ugly approach to the game, the league as a whole is likely to suffer as viewers simply tune the sport out.

Similar to efforts at optimization, the incentives of sports as a whole have to be checked and balanced to retain a workable equilibrium. Sports leagues typically use rule changes and other adjustments to get teams in alignment with each other. Draft odds can be changed to reduce the incentive to lose games, and rules can be altered to prevent certain defensive approaches or incentivize aesthetically pleasing strategies. Leagues can enforce financial penalties, like salary caps in football, luxury taxes in basketball, or financial fair play in soccer to restrain spending and maintain a more competitive balance. Sports analytics offer teams the promise of staying ahead of these rules to maximize their desirable outputs and minimize their less desirable costs. Billy Beane and the Oakland Athletics used analytics to field a cheap, successful team. The Warriors combined analytics with their checkbook to field an expensive, championship team. Both sought an edge, a new angle on solving the game, through their use of optimized strategies for team building and play.

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As sports analytics have advanced and become increasingly sophisticated, they offer a roadmap for how to think about optimization in games. Both have to address the common pool resource problems that result if a game gets solved or if strategies of play become stale and boring. Sports are way ahead on the analytics front, with large communities of fans and employees of media organizations producing publicly accessible data and analysis, while scores of franchise employees focus on developing proprietary analytics to give their organization an extra edge. As of this writing, there is currently way more money behind figuring out sports than games, with funding coming everywhere from teams and media organizations to betting syndicates who can realize a financial edge if they understand the game better than their competitors and the sports books.

Moreover, sports leagues also have more centralization than video games, with core leagues adjudicating play for the handful of professional franchises that play the games. They also face a greater existential risk if their games get solved and are rendered boring. There are many different video games out there, and players can pivot from one to the next. But there is only one football league, a couple of basketball and baseball leagues, and a handful of soccer leagues at the top level. If any are "solved" by analytics, the economics behind them are likely to collapse. Tracing what has happened in sports offers perspective on the stakes of optimization in video games. Starting with baseball, where sports analytics began, then moving to basketball, football, and soccer in chapter 4, sports give a point from outside of video games to look back at them. As games are increasingly optimized, how do they change? How do leagues alter the rules to get the product they want? How do teams pursuing optimization break the game to get an edge for themselves? And how can the common pool resource problems at the center of optimization in games be addressed?

Baseball

With over a century of play behind it and a few decades of quality statistics, baseball is a haven for the analytically inclined. Starting with basic statistics on the back of baseball cards, an argument can be made that analyzing the stats around the game is often more interesting than the game itself. But the analytics fueling baseball have become increasingly sophisticated in the twenty-first century, leading to massive changes in how the

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game is played and how teams seek to optimize their approaches to winning. From defensive shifts to manipulating service time to the three true outcomes, contemporary baseball is quite different than what was played decades ago. Add in changes like modern physical training and workout regimens, a global player pool, and the amenities that come with chartered travel, and it becomes difficult to compare this era of baseball to the past. Understanding where baseball is now requires a bit of a look back to how it has changed with a melancholic lament about the impact statistical analysis had on the game as the sport has steadily crept toward becoming a solved game.

As Bill James's analytical approach to the game, often called sabermetrics, became increasingly prominent, he was careful to note that context was vitally important in analyzing baseball. Everything from different park effects to the impact of the specific place where you play to the specific ball being used affects what happens in play. James thought statistics could give insight, but those holdings needed to be considered in light of other factors as well. Analytics are a tool but not the only one, and James has concerns about how far some take the insights analytics offered to understand baseball and how it worked. James argued that analytics are a way of seeing the game in new ways, but the insights garnered from them need to be paired up with knowledge derived from playing the game and compared to past traditions and norms of how the game was played. Effectively, the content and human involvement adds variance that keeps sports from ever actually being solved.

Historical trends are often held up as a core part of baseball and a key reason to resist analytical insights. Baseball is one of the few games played without a clock; under extraordinarily specific circumstances, a game could go on forever. It is the oldest US professional sport, and its fan base notably skews older and whiter than many other sports. In the midst of this stability the game may seem the same or may appear to have only begun to change recently, but there are far more consistent alterations to the game than is typically acknowledged. In a story about changes being made in an independent baseball league,[8] Zach Buchanan argues that "the game always has changed more, and more often, than many acknowledge—see the DH [designated hitter], modern bullpen usage, defensive shifting."[9] Although some of those changes were preceded by analytic insights, there are plenty of other alterations that also impact the game, like the raising or lowering

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of the pitching mound to make pitchers more or less powerful and the introduction of humidors to attempt to keep baseballs consistent at different altitudes and humidity levels. Games regularly adjust to adapt to the circumstances in which they are played, but the deployment of analytics has sped up the rate and adoption of changes in baseball, most notably in the defensive shifts and the three true outcome approach to the game.

For more than a century of play, baseball players lined up in a fairly predictable pattern in the field. Three outfielders would spread throughout the outfield relatively evenly. On the infield, four infielders would split up with two between first and second and two between second and third. Depending on the situation, like whether or not there were runners on base or whether the batter was left- or right-handed, defensive players would rearrange themselves somewhat, but analytics have given reason for defenses to radically alter their alignment by deploying heavy shifts. Instead of spreading evenly throughout the field, the shift accounts for the fact that many hitters pull the ball, particularly when they are trying to hit for power. The shift rearranges the defense, putting as many as five of the seven defenders on one half of the field, leaving two to protect the side where the ball is less likely to be hit. In 2013 there were only 6,882 defensive shifts, a number that skyrocketed to 59,062 by 2021. The year 2021 also found more than half of all balls put in play were hit into a defensive shift as batters hit the ball much like analytics predicted.[10] And referencing analysis done by Bill James, Jayson Stark argues that in 2021 there were "22 percent more hits taken away by the shift than given away by the shift."[11]

Defensive shifts put the defense in a better position to stop the offense, particularly left-handed power hitters, but they do so at the cost of taking away hits and arguably making the game less exciting for fans. Analytics may make individual teams more likely to win, but the widespread adoption of an approach like this can make the game less fun to watch and, at least for the hitters impacted by it, less fun to play. As the shift spread in popularity, the number of articles discussing why baseball should ban the shift exploded, and trials took place in minor league baseball to test different rules to stop teams from shifting to get more hits and action back into the game.[12] The shift was a highly contentious approach to defense and an explosive case of how the analytically optimal way to play the game was in significant tension with the most aesthetically pleasing way to watch baseball.

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A second piece of background information necessary to understanding the impact that analytics has wrought on baseball is the concept of the three true outcomes. Named for the events of the game that are exclusively within the control of the hitter and pitcher, the three true outcomes of baseball are a strike out, a walk, and a home run. In all three of the instances, the defense has no role to play; they merely stand on the field and watch as one of the outcomes occurs. Teams have found that the three true outcomes often play into the hands of team building as teams can focus on getting walks and home runs without the pesky defense getting in the way. The three true outcomes are a way to solve baseball by limiting the variance that can come from greater, more interdependent human interaction. This approach, of course, increases strike outs as a notable externality, but a strike out is far better than a double-play ball that could end an inning or take an additional runner off the basepaths.

Moreover, as teams emphasized the three true outcomes, home runs have ticked up somewhat and strike outs have skyrocketed.[13] Strike outs are an ideal result for a pitcher, as they record an out without any risk of a defensive error messing things up, yet they are similar to any other out for a hitter. Plus, teams have accepted that the pursuit of walks and home runs will lead their hitters to have more strike outs. The consequence of this approach is that there is far less action in the average baseball game now. Three true outcome plate appearances lead to a definitive result with no hustling, shuffling, or chance for the unexpected to occur. Much like the defensive shift, building a team around the three true outcomes works really well on an individual basis but leads to less of the action that can make the game more fun to watch.

These two overarching examples give an indication of how baseball analytics have impacted how the game is actually played and the perils of becoming a solved sport. Taking a step back before zooming in to some specific examples of how teams have used analytics or sabermetrics to guide decisions, Steven Goldleaf's 2017 article for Bill James's web site, titled "How Sabermetrics Has Ruined Baseball," gives context to analytics in baseball. Goldleaf starts from the premise that sabermetrics and analytics are "the greatest enhancement of baseball (all sports, really) since the invention of the hot dog bun, and that it has added to my enjoyment of baseball, and my appreciation, in more ways than I can hope to name. But here's my objection to this source of pleasure: Something that makes

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winning more likely is not necessarily making the game more enjoyable to watch."[14] Goldleaf homes in on a central issue with an analytical approach to the game, that it rewards thinking and careful decision making, but all of that work takes time. He argues that "most things that improve a team's chances of winning take time. Often, lots of time."[15] This time is worth it for the teams since they stand to reap the rewards from the decisions, but for fans and others associated with the game, the time is a drag that slows the game down and can make it less interesting.

Goldleaf builds to a crescendo in line with the overall argument of this book:

> My point here, if I have one, is not so much that sabermetrics has already ruined baseball (that's the clickbait part) but that in theory it could ruin baseball, in that its goal to create a type of game that optimizes winning, while fans want to see a type of game that is entertaining to watch. These two desired ends have literally nothing to do with each other. It's only a happy coincidence (coupled with some ignorance that sabermetric study has wiped out) that winning games and enjoying games have mostly meshed over the years, but less and less as we have come to understand how to optimize winning.[16]

He contends that the historical use of analytics has largely led to greater enjoyment of the game as initial insights about concepts like on base percentage and run creation led to more dynamic, interesting play. However, as more and more data was mined, the move to concepts like the defensive shifts and aggressive use of pitching substitutions work in the service of teams optimizing their chances of winning but against the interests of those seeking to enjoy watching the game. Effectively, optimization is often in tension with producing something fun as the goal is solely centered on winning rather than on the ineffable joy that can be derived from a well-played game.

The push of analytics toward winning is key to its adoption, but an analytical approach is often myopically focused on min/maxing and getting the most output from the least investment. Goldleaf contends that the adoption of statistics is tightly connected to the visible impact baseball analytics have had on teams that employ the approaches successfully, writing "It's only because so much of sabermetrics leads arguably or directly to winning games on the field that it has become as widely accepted as it has. And what I'm arguing here is that most innovations loosely or tightly affiliated with sabermetrics tend to add time and complexity to the game, toward that goal of winning."[17] Optimization zooms in on one part of a game, the

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goal of doing the best one can to win. Other factors, like time spent playing, joy, or a compelling and interesting viewing product or play style fall to the wayside if they are not also optimal for winning. However, when sabermetrics work, when a new strategy is shown to be the best route to victory, those seeking to win rapidly adopt it, spreading the gospel of sabermetrics or theorycraft and pushing all other concerns aside. Repeat this cycle enough and a game gets solved and may have become insufferable to watch in the process. In baseball, Goldleaf writes that "sabermetricians have come up with this idea [substituting in fresh pitchers in key game situations], and many others, because they thought that maybe, just maybe, this would give an edge to teams willing to test them out. When they were found, in fact, to correlate with winning, they became universally accepted."[18]

Throughout this book, I am arguing that the move toward universal acceptance is the danger point for sports and games. As the community around a game begins to solidify around an optimal approach, the game calcifies and becomes closer to becoming tic-tac-toe. Early sabermetrics happened to align with the greater incentives of the sport as a whole by creating a more entertaining game, but as Goldleaf notes, that was a happy accident rather than an intrinsic connection. Over time, the spread of optimized approaches to baseball moved in the direction of a common pool resource problem. Each team has an incentive to play in a manner conducive to winning, but as they do, the game gets longer, less action packed, and less compelling to watch. The search for an optimal approach to win is at the root of those changes, and disrupting it is in the interests of the group as a whole but not typically the best choice for any individual team. Given this high-level view of how optimization impacts baseball, it is appropriate to zoom in to examine specific examples like pitching, rule changes, and some inherent instability built into the game to point toward how to address the impact of sabermetrics.

Starting Pitchers

One of the traditions of baseball is that the starting pitcher for each team is a pivotal part of the game. Starters are generally the best pitchers, and some of the most celebrated players have been pitchers who can make even the best hitters look foolish. Often, they are the faces of the franchise, and their names are the only ones specifically advertised in advance of the game. The

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best starters draw fans to the ballpark in anticipation of what they can do in one of the every five games or so that they will pitch. However, analytics complicate the role of the starting pitcher. For decades, the presumption was that the best pitchers should seek to pitch complete games, mowing down hitters and flaunting their brilliance. One of the most celebrated feats in baseball is the perfect game, where a pitcher is so good that no batters reach base. Following closely behind that as an accomplishment is a no-hitter, where a pitcher allows base runners but no hits from the opposing team. However, both require a pitcher to throw a complete game, facing every batter in the lineup at least three times.

Analytics have dramatically changed how pitchers are used in the modern game. First, sabermetrics demonstrated that a pitcher on their third time through the batting order is much more likely to encounter adversity. This means that teams often pull their starting pitcher out as they are set to begin their third trip through the order. Second, the veneration of starting pitching meant that they were more likely to receive media attention and massive contracts. Devaluing the role of pitching serves the economic interests of teams as they can pay more people less money overall to do parts of the job that used to be attempted by one star. Third, the move to devalue pitchers is an example of how analytics favors efficiency over entertainment.

Seeing a pitcher with their best stuff hurling a no-hitter is more exciting than watching a parade of players from the bullpen proceed to attempt the same feat. In game 3 of the 2021 World Series, the Atlanta Braves pulled their starter, Ian Anderson, after five innings even though he was throwing a no-hitter. The Braves then went to their bullpen, and their four top relievers went on to complete the shut out. Ken Rosenthal acknowledges the approach is the optimal strategy but still laments its impact on the game, writing

> we get it, all of it. And yet, the trend still stinks. The best starting pitchers—Max Scherzer, Gerrit Cole, Jacob deGrom, etc.—are stars who sell tickets and attract TV viewers, ranking among the top entertainers in the sport. The days they pitch are events. Even casual fans get caught up in their achievements. And yet, the way the game is evolving, the species is becoming virtually extinct, especially in the postseason, when the audiences are largest and the games matter most.[19]

In the postseason, when victory is paramount, teams are almost certain to pursue what they believe to be an optimal approach. The abstract needs

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of the whole pale in comparison to the quite specific interest in success for a team chasing a championship. Individual teams and players cannot be trusted to act in the best interests of the whole if it conflicts with their primary incentive to win the game.

The Braves did not originate or even popularize the approach of removing starters so quickly; instead, it was the Tampa Bay Rays who used the 2018 season to debut the limited starter approach. After a raft of injuries, the Rays insisted on changing the language they used for pitchers, calling the pitcher who started the game the "opener" rather than the starting pitcher. This rhetorical shift is quite notable as it devalues that initial role and clearly indicates that the job of pitching is going to be divided over several players rather than centralized around stars. The Rays were expected to struggle greatly in 2018, and injuries to and trades of their best pitchers only compounded the likelihood they would be one of the worst teams in the league. Informed by analytics and a desire for cost control, the shift to an opener allowed a cast of little-known pitchers to vastly exceed expectations, outpitching the starting stars who led other teams. The strategy also had knock-on effects for the Rays financially, as Jon Tayler notes that it hinged on having early career pitchers "with little to no major league service time and experience both starting and relieving. That makes them cheap and malleable, which is key to the strategy."[20] The pitchers needed to be early in their career, so they were not as set in their ways and did not really have the power to object to the new approach. Additionally, using young arms made them effectively fungible. Instead of paying a star top dollar to pitch every five games, the Rays could pay a collective much less than that and then trade players when they got more expensive, only to replace them with younger, cheaper alternatives.

Two years later, in 2020, the Rays found themselves in the World Series against the star-powered Los Angeles Dodgers. The Rays had their best pitcher, Blake Snell, back from injury, and he began the pivotal game 6 with an exceptional start, allowing only one hit through six innings. With a narrow 1–0 lead, Snell gave up a hit and was pulled from the game. The Dodgers went on to overcome the Rays bullpen and win the World Series. The reliance on analytics got the Rays to the precipice of a championship, but analytics are built for the long run rather than the short-run, and the failure in the game led to massive criticism when the analytics-informed decision did not work out. As Jabob Shafer criticizes, "no philosophy is perfect, and

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baseball will always be about instinct as well as numbers. Maybe pulling Snell was Cash's [the manager] call. Perhaps it was mandated from above. Either way it blew up in their faces."[21] The optimal makes sense until it does not, and analytics-informed approaches bring risk to both the game as a whole and to individual teams, as doing something novel exposes them to sharp criticism when they fail.

The Costs of Solving Baseball

The analytics-fueled takeover of how to best play baseball extends to how teams are run as clubs seek every edge they can get in order to win, even if the moves stand to destabilize the game as a whole. Ken Rosenthal sees the erosion of starting pitching as a crisis, one where pulling a successful starter in a World Series game should "be the final example of all that must change. Starting pitching is dead. Long live starting pitching."[22] Other pressures are financial as teams seek to maximize their odds for success by manipulating the rules in order to pay players less. About three years before the player lockout that came in 2022, Marc Carig wrote that "baseball has undergone a scientific revolution, and industry insiders describe a new generation of club officials who treat team business like exercises in game theory. Within the modern-day front office, seizing every advantage granted by the rules is a central tenet."[23] To push the boundaries and pay less to players, teams refused to call up top prospects to the majors, manipulating their service time to pay them less money and control their career farther into the future. The push to optimize the individual success of teams threatens the collective, driving the interests of those that push for every edge against those who are pushed. Optimization at all costs has risks, from devaluing starting pitching and the product on the field to antagonizing the labor force to such a degree that collective bargaining becomes incredibly difficult.

The collective group of a game is far from helpless in cases where optimization is running amok. In the case of a sport like baseball, the most straightforward fix is to start changing aspects of the game to rebalance it and make it work more closely to the intended goals. Concerns about the dominance of the three true outcomes led MLB to debut a new ball in 2021 that was designed to carry less after being hit so there would be fewer home runs.[24] In 2020 baseball changed the rules around pitching by requiring that

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pitchers either face three batters or end a half inning in an effort to stop the parade of relief pitchers coming into the game and to speed up how quickly games were played.[25] Players also took steps on their own to address aspects of the game they found distasteful. A slick ball led many pitchers to pursue extra-legal means to add substances to the ball to aid their grip.[26] As "almost everyone" was "probably cheating" by applying illicit substances, pitchers found their control increase and, as a nifty side effect, were able to increase their spin rates on pitches, making it harder for batters to hit the ball. Justified under the auspices of having to deal with a bad ball provided by MLB, pitchers optimized and found their own edges by remaking the rules to serve their individual interests against those of the whole.

In advance of the 2023 season, MLB introduced a swath of new rules intended to battle back against attempts to optimize the game. Most notably, baseball flat-out banned the defensive shift by dictating that there must be two infielders on each side of the field prior to pitches. Additionally, the sport instituted a pitch clock to speed the game up, larger bases to generate more aggressive running on the basepaths, and a number of other moves to speed the game up and generate more action in less overall time. Framed as an effort to "fix baseball," the changes fundamentally altered how the game worked and almost all were designed to push back against trends toward optimization.[27] Even as the changes were being rolled out, teams started to experiment with new edges to the rules, like repositioning their outfielders more aggressively in response to the ban on the defensive shift, but the changes already made are evidence that MLB will likely move more quickly to prohibit widespread action that is deleterious to the game as a whole.[28] In the initial wake of the changes, MLB commissioner Rob Manfred felt that they were successful enough to crow about how use of analytics was no longer as significant advantage for teams and that the league was back in charge of what was best for baseball.[29]

Because the game is played by humans with human-built implements, there is also a notable and important variability built into a sport like baseball. The ball is subject to great debate as different leagues use different balls and MLB's process of preparing baseballs has traditionally been to use handmade balls with specific mud applied to them by hand. Wielding computer-aided analytical tools, the league has found the variance among balls is quite high and the balls are inconsistent, leading to differences in how they work in play.[30] Bats are made of wood, a natural product with

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inherent variability. Companies like LongBall Labs have sprung up to help hitters analyze the inconsistency in their primary tool and have found that because each tree is different, each bat is, too, and some are much better than others at hitting a ball out of a park.[31] Natural variance complicates efforts at optimization. Even as players ship their bats to be analyzed and assessed, there is something a little different about each one that prevents settling on a stable, singular, best approach. Players also seek out companies to help them choose the best style of bat, with companies such as the Baseball Performance Lab helping fit players to bats because they have discovered that many players select a bat that is comfortable to them, not the one that will perform best for them. Optimization can push us out of our comfort zone, as analytical tools are there to show us the best route to maximizing performance that we may not readily recognize without external advice.[32] The indeterminacy of what is best adds uncertainty to play even as players have vast personal incentives to figure out what is optimal, though they may not be able to find it without help.

Analytics in baseball are incredibly sophisticated, and sabermetrics has a history that predates theorycrafting by decades. Baseball demonstrates many of the pitfalls that can come with rampant optimization, as approaches to the sport homogenize and better serve the interests of individual teams than players or the sport as a whole. Analytical approaches can be destabilized by rule changes, which work as patches to make one approach less effective or outright illegal. The vagaries of natural implements also add variance into the game as fibers, mud, and wood combine to make each key piece of equipment a little bit different than the others. Although the overarching strategy to baseball is largely sorted, the infusion of some elements of randomness combined with the league's desire to create a watchable product mean that baseball is yet to be fully solved. The ongoing questions raised by those features offer a way to think about how to disrupt optimization in video games; however, three other sports demonstrate the incentives for teams to optimize more complicated games and also the perils to those sports as optimal approaches are found.

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4 Less Solved Sports

Following largely in the wake of individual teams' success in optimizing baseball, data analysis hit other major professional sports. The clear recognition of how teams employing analytics were successful prompted teams in less analytic dominant sports to chase an advantage, seeking to find an edge before their opponents. As a common pool resource problem, analytics offers sports franchises a massive first mover advantage. If you are the first team to find a new optimal approach, you can reap the benefits of that advantage until other teams catch up, while if your opponents are finding that edge before you, your team is likely to struggle until you can decipher exactly why they have gotten ahead of you. As a result, concepts that were test driven in baseball quickly landed in other sports, accelerated by the fact that many US-based sports franchises are owned by common ownership groups across multiple sports.[1]

The combination of less time developing analytics than the almost half century devoted to baseball and the more fluid play featured in sports like basketball, football, and soccer means that these games are not nearly as solved and sorted as baseball. However, these games offer a fantastic chance to examine where and why optimization can take hold in games and where it can falter. Additionally, they give further context into how leagues can disrupt the efforts of those acting in their self-interest and preserve the common pool resource of a watchable, engaging product. Building from the background on sports established in chapter 3, this chapter moves from relatively most solved sport to least, taking on basketball, football, and soccer in that order. Each has lessons about how optimization works in practice and where the interests of teams conflict with what may be best for the sport.

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Basketball

Basketball analytics are in a middle space. Not as clearly defined as baseball but arguably beyond where most other sports are, basketball is a game that has seen a major reorganization around optimal strategies in an attempt to win more games. There are two key aspects of optimization in basketball as played in the NBA, one of which has largely been patched by rule and the other has revolutionized how the game is played and how players are valued. In the midst of these two massive changes, additional aspects of basketball are tied to how it is being optimized, like rule changes, analytics for referees, and blind spots in analytics. Basketball offers plenty of ground on which to reconsider how attempts at optimization play out and what that can teach us about games and how they work.

The first major breaking point for basketball analytics was led by the Philadelphia 76ers. Under new general manager Sam Hinkie, the 76ers accurately realized that the most important part of winning in the NBA was getting star players, and the most likely way to get one of those star players was to pick at the top of the draft. The NBA has a draft lottery that awards the top picks in the draft via a random draw. After drafts featuring relatively flat odds for each team had been won by teams near the middle of the standings, incentives were increased for the worst teams to get the best picks to spread talent around the league. Realizing this, Hinkie traded away his best player in 2013 and then subsequently traded away all the other players he could to accumulate more draft picks for the future.[2] By bottoming out and chasing additional draft capital to build a mythical future team, Hinkie was optimizing the draft process at the cost of the current team. With backing from ownership Hinkie's strategy, dubbed "The Process," was about stockpiling future resources at a rapid pace by actively trying not to win before the NBA stepped in to stop it.

To address The Process, the NBA took several steps. First, the league pressured 76ers ownership to hire a more experienced executive above Hinkie to oversee the organization, bring the team into greater alignment with the desired ends of the NBA, and get the 76ers to be less ambivalent about losing. Jerry Colangelo was brought in to oversee things, and Hinkie eventually resigned, only for Colangelo to lead the search for the new general manager and hire his son, Brian, into the role.[3] Although Brian Colangelo's reign would end with burner phones and fake Twitter accounts, getting rid

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of Hinkie sent a message around the league that outright tanking, an overall indifference about winning and losing, would not be tolerated.

In addition to pressuring for management changes, the NBA also opted to change the rules for the draft lottery. Instead of the worst team having the best odds for the top pick, the worst three teams would all have the same odds, somewhat disincentivizing losing games. As of this writing, the changes in odds have not fully worked as several teams still try to maximize their odds at a top pick by losing games, but the outright disinterest of the 76ers in prioritizing winning in the present day to increase their chances of winning in the future was remarkable.[4] They took an incentive structure and started making the quiet part, that certain teams did not really want to win games, loud. By pursuing the optimal strategy for their team, they risked the integrity of the league as a whole, and the NBA responded by both strongly encouraging the team to change direction and restructuring the incentives for all teams. The NBA saw a common pool resource problem in the allocation of future draft picks and changed the rules in an attempt to restore the competitive balance of games played by the teams with the worst records.

Spaced Out

Although the saga of the Process-era 76ers is one of the most remarkable stories I have followed in sports, the most revolutionary impact analytics have had on basketball is a fundamental change in the way the game is played. The three-point line, which was popularized in the American Basketball Association, rewards players for shooting the ball from farther away from the basket. After the American Basketball Association merged with the NBA, the newly reformulated NBA opted not to include the three-point line. However, the league announced that the 1979–1980 season would feature a one-year test of a three-point line. The line was retained, but for decades shooting from distance did not have too much impact on the game.[5] To try to make the three-pointer a larger part of the game, the NBA opted to move the line closer to the basket for three years from 1994 to 1997 but eventually decided to move it back to the original distance, where the line is twenty-two feet from the basket in the corners and twenty-three feet, nine inches at locations where the arc curves from one side of the court to the other.[6] Over three decades after the three-point shot was

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introduced, general manager Daryl Morey charged his team by using analytics to take advantage of the three-pointer, fundamentally changing how the game was played.[7]

Before the 2012–2013 season, the Houston Rockets had failed to make the playoffs for three years in a row. In the offseason they traded for James Harden, who had been a promising bench player with his former team.[8] In a summary of their approach to the season Jared Dubin recapped that

> the Rockets re-engineered their offense to play not only to their new star's strengths, but also to The Math. It was during that seasons that the Rockets began their maniacal pursuit of the most efficient shot on every single possession, turning their collective backs on years of NBA tradition by eschewing the lost art of the mid-range jumper whenever possible in favor of attempts either at the rim or behind the three-point line.[9]

At the time, the perspective looked strange as the Rockets were using an approach radically different from other teams, and their games looked like some other sport. Harden was a master of drawing fouls and setting up teammates, and the basic insight underpinning the approach, that three is greater than two, started to win games. The Rockets only needed to make a third of their shots from three to match the points they would get for making half the shots worth two points. Based on that basic insight, they dumped all the inefficient two-pointers to increase their two-point shooting efficiency and also gave the green light to bomb away from three.

After years in charge of the team in which the Rockets had several strong seasons but never quite sealed the deal, Morey walked away from the team in 2020.[10] John Hollinger wrote that his departure was not "because the NBA stopped using analytics. No, Morey's exodus came about, at least in part, because of the opposite reason. The rest of the league adopted this revolution so quickly and so thoroughly that nearly all the low-hanging fruit has been picked clean."[11] As Jared Dubin notes in his breakdown of the Rockets, the quick adoption of the strategy by teams across the league pulled the Rockets back to the pack and hindered their chance of winning.[12] In practice, the Rockets found the most efficient strategy first, but as soon as other teams began to copy the approach, the Rockets soon learned that other teams were better at shooting from distance than they were. Or as Hollinger says when he summed up the impact the Morey-led analytics revolution had on the game, "It's over and the nerds won, and now we're on to whatever comes next."[13]

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There are videos that best document the change in shots taken over time, but it took almost ten years for a team to take 10 percent of their shots from three-point range when the 1987–1988 Boston Celtics did it. As the Rockets rolled out their new approach, their 2016–2017 team became the first to surpass both the 40 and 45 percent mark of their shots from deep, and the following season they took more than half their shots from behind the three-point arc. Over about ten years, teams began shooting from distance over 150 percent more often than before, and they did so with increasing accuracy as players were evaluated largely based on their shooting ability.[14]

As the game changed, the NBA was tracking what play looked like. The increased shooting from deep opened up the game, and the barrage of threes matched American Basketball Association commissioner George Mikan's belief that three-pointers were like home runs that would bring fans out of their seats.[15] However, the ruthless quest for efficiency also led the Rockets and some other teams in search of more ways to wring points out of the game. Rockets star James Harden began shooting slightly differently, kicking his legs out to draw shooting fouls while attempting three-pointers or rapidly moving the ball up and "shooting" through the arms of defenders. Although Harden was exceptional from distance, The Math approach to basketball successfully reasoned that the most productive play was having a good foul shooter get fouled on a three-point shot. In those cases, a player might even score four points with a made three-pointer and a free throw, making the opportunity incredibly lucrative. Ben Dowsett describes the approach as "this isn't really basketball, but it's in the rules, so what can you do?"[16]

In response to the cynical technique, the league changed how it officiated the game in advance of the 2021–2022 season, refraining from calling fouls when offensive players initiated contact with a defender. The head of referee training and development, Monty McCutchen, argued that it was "actually changes to rule interpretations, not rules themselves" and was driven by the fact that "younger players began to see this was an efficient way to get points. It became clear this was not a part of basketball we wanted to continue."[17] The Math won, but the league struck back, reining in the parts of the optimal approach to play the NBA found distasteful while allowing the changes that helped propel stars like Stephen Curry into celebrity status. Optimization led to a bad outcome for basketball as the tragedy of the commons incentivized attacking players into unnatural

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movements that slowed the game down. Once the exploit was discovered, the only way the league had to address it was the blunt force approach of changing the way the game was officiated.

As the Rockets struggled and the league caught up, Harden went from MVP to a highly criticized symbol of optimization run amok. As Liz Franczak writes,

> Harden is alarming for the very same reason he is thrilling: there is a perverse pleasure in watching the system grind to a halt and get torn apart, in watching that which was preemptively deemed the great ideal shredded on national television by a bearded everyman with the body of an elementary school security guard. For those of us who aren't thrilled by the STEM-induced coma sports are currently stuck in, watching the weight of advanced analytics collapse onto itself, watching bloodless efficiency fail to deliver the promise of perfection, has been more than a twisted delight.[18]

Harden and the Rockets's failure was celebrated by some because their extreme chasing of the best way of playing for the sake of winning, without concern for the aesthetics, did not end up winning a title. In line with McCutchen's response that certain parts of their approach were actions the league did not want to see continue, the tension between the interests of the players, teams, and the sport are laid bare by the reaction to the Rockets and Harden. A fan of a team may be willing to back an optimal, winning approach that is not fun to watch and bends all the rules and norms in their favor. But the league and neutral viewers, not to mention fans of other teams, often want something different. Recognizing and encouraging those less optimal approaches requires rethinking rules, balance, and how the game can be played. Then, of course, teams will find a new edge, the fresh meta, and the cycle starts anew.

Changing Rules

One important piece of how the NBA works is that rules are regularly changed. Although it may seem like basketball is the same from year to year, subtle adjustments make for a different kind of game as some things are made illegal and key incentives are adjusted. The Process led to a change in the odds in the draft lottery. Harden and others led to new interpretations of how fouls are called. There are regular changes to how the game is refereed over time as replay was introduced, a third official was added, and

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training of officials stepped up. At this point, "today's officiating department relies more than ever on a well-known sports buzzword: Analytics."[19] Just as teams are using analytics to increase their chances of winning, decisions made by officials, both those where they call fouls and those where they let play go on "is graded by impartial observers, then inputted into a vast database including every official in the league."[20] The assessments of the referees are used for training and to decide promotions and key assignments. The league uses data analysis to optimize the judgment of officials, with the intent of improving the whole. The training and analysis is designed to create a consistent environment for players and to normalize how decisions are made across games. By optimizing rule enforcement, the NBA seeks a standard product, one in line with their expectations and goals for the game.

There are gaps in basketball analytics, and plenty of areas where what is optimal is in tension with what makes the game fun to watch. Much like the issue in early baseball analytics, the lack of clear data or consistent statistics makes using analytics to assess defense quite difficult.[21] Steals and blocks are tracked for players, but proper rotation, recovery, and positioning is much more difficult to assess. Defensive analytics are even more complicated because teams use different strategies, and what could be the right decision in one game may be the wrong one in another. Players also seek optimal approaches where they can find them, and one of the tension points in the lead up to the 2022–2023 season was the "take foul." Take fouls are given by defending players to stop fast breaks. When a team turns the ball over and their opponent begins streaking past them, a player on the team who turned the ball over reaches out and grabs someone on the newly attacking team, stopping play before a fast break can occur. It is a viable defense strategy, trading what is almost certainly a made basket in exchange for forcing the team to inbound the ball after the defense can get set up. However, it is also horrible to watch as what could have been an exciting play is stopped and replaced with a regular possession.[22] An additional example is "walking the dog," where teams winning late in the game choose to roll the ball on the court when they inbound the ball instead of directly passing it to a teammate. As the ball rolls along the court, possibly even coming to a full stop, the game clock runs, but the twenty-four-second shot clock does not. Walking the dog enables a team with the lead to reduce the number of possessions left in the game by sucking action out of the

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game until they are actively guarded by the defense. A review of the history of the technique closes with NBA announcer Mike Breen observing that the point of the game is "to win" and that you can "get a victory just by outthinking a team and beating them at the mental game."[23] Playing optimally does not necessarily mean what is most exciting or best for the game as a whole, and the moments where what is best for a team is in tension with the greater interests of the NBA generally results in new rules or at least new interpretations of existing rules.

Basketball analytics have thoroughly remade the game over the past decade. Contemporary basketball strategy shares little in common with what was played when the three-point line debuted. Offense has taken off, getting sharper and spreading the floor. Different skills sets are valued as being able to shoot well is nearly imperative, and players are assessed based on their mobility and ability to guard opponents all over the court. Analytics have also prompted reassessment of historical players, as high school basketball analytics clubs led successful campaigns to get Marvin Webster and Ben Wallace enshrined in the Hall of Fame.[24] As the search for what is optimal has remade basketball, the game has largely stayed in balance because the league is quite active in stamping out the efficiencies they do not like while allowing teams to run with those they do. The consistent rebalancing means that any edge may only last for a little while, but the NBA's active stance on rule changes and enforcement helps avoid the sport from getting stuck in an ongoing common pool resource problem.

Football

Baseball and basketball address many of the ways the search for optimal strategies can be seen in contemporary sports, but a brief look at football sharpens two key points. First, much like in other sports, tracking defense properly is incredibly tricky. Most football analytics track offense, largely because that is where the easy to access statistical data is most prevalent.[25] As Josh Hermsmeyer writes, "if analytics is a set of festive Russian nesting dolls, the final pea-sized matroyoshka is defense."[26] Hermsmeyer notes that analytic models and betting markets can readily adapt to changes made in offensive skill position players, but when similar substitutions are made on defense, it is hard to know what the change means. Part of this is because of the classic analytics issue dating back to Bill James's early work: when you

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have bad or incomplete data, it is impossible to produce good data analytics. Hermsmeyer also points to a larger, conceptual problem though:

> It's likely that the lack of predictive power in defensive analytics has to do with the reactive nature of defense. NFL defenses are highly interconnected, weak-link systems. What does weak link mean? It means that if just one person in the defensive chain fails, the entire unit is assigned that failure. We can measure that failure, but the fact that we can't predict future defensive performance implies that the precise *types* of failures we're measuring are unlikely to occur exactly that way again. Most NFL defenses are good enough to not repeat the same mistakes over and over—they just find new and exciting ways to fail. All of this makes apportioning blame and properly accounting for success pretty difficult.[27]

In most sports, offense sets the terms for engagement. Defense may have plays and strategies, but much of their approach is dictated by what the offense is seeking to do. Beyond this fundamental orientation issue, big things that happen on defense are often the result of players being in position to do or not do something. One can assess the whole of the defense and their response to events in games, but apportioning blame at the player level is quite difficult without clearly knowing what a player was supposed to do and where they were supposed to be. Is the root of the failure a bad play call? Confusion? Bad luck? Someone else not doing what they were supposed to do? Without transparency into the plans of the defense, it is hard to assess where the blame for a mistake lies in deeply interconnected systems. Teams are likely in a better position to evaluate their own players and how they fit the scheme and plays that are called, but the knowledge of what they are trying to do on each play is proprietary and need not be shared publicly.

This is not completely dissimilar from how pricing models in the game industry work. The game companies hold vast, granular data about spending that can inform the decisions they make about how they price new games, downloadable content, and cosmetics. However, analysts on the outside can only see aspects of the visible results. We are unlikely to know about failures or intent unless they are explicitly mentioned. And when one is limited to questionable or absent data, there is only so much assessment that can be done by external parties.

A second major area of football analytics is the role of outside critique and the short run. Football plays the fewest games of any major sport, with a season consisting of only seventeen games before a single-elimination

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playoff to determine a champion. The combination of a short season and single-elimination tournament puts incredible pressure on each decision in every game. Unlike other sports, where there are more chances for results to even out over time, a single optimized attempt that fails draws an exceptional amount of attention and can lead to decision makers losing their jobs. In a breakdown of key decisions in the 2021 National Football League season, Stephen Holder contended that the overarching framework around analytics-informed decisions is often negative. Analytics are presumed to be wrong, particularly when the result ends up being negative. After a thorough review of crucial moments from the season, Holder observes "Because integrating analytics often becomes a flashpoint in postgame analysis and can still be seen as controversial, the coaches who make these decisions must have a certain amount of chutzpah to go against the proverbial grain. After all, who wants to be the guy getting trashed on national television?"[28] The short-run pressure does not allow the sample size of hundreds of at bats or three-point shot attempts. Instead, football decisions often break down to singular moments where something either goes right or wrong, and within the culture of football commentary, analytics have not been established as a sufficient cause to overlook a bad result. Unlike John Hollinger's observation that the "nerds" have won the revolution in how basketball is played, the preeminence of math has not extended to all sports.

This pairing of features, a limitation in what can be known and a hesitance to trust the math, both bear on the state of theorycrafting in games. It is important to remember that some things either cannot be known or are unlikely to be quantified easily. In those cases producing an answer based on analytics is going to be exceptionally complicated, and the knowledge gained will be partial. Players typically have insight into certain kinds of information, but they are rarely omnipotent, and the areas where a player cannot draw reliable data is a space where their theorycrafted holdings are likely to be limited.

Additionally, the common knowledge of a community can short circuit attempts to play via the math. Basketball and baseball have largely accepted key analytic holdings, but football has held out to a greater degree. The culture in which theorycrafting happens matters. Just as processes of optimization can limit the options in a game, the expectations around a game can limit attempts to theorycraft. Math-based knowledge may seem certain and impartial, but analytics holdings rely on a belief that the formulation

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of those strategies actually shed proper insight into how something should be done. There is a substantial amount of pressure to do what is expected and what is normal, and in a community where analytics are not normal it will be an uphill battle to use them in informing decisions. Establishing trust in analytics is especially difficult in situations where the short run takes precedence over the long run. The more iteration and repetition is possible, the more an optimized strategy can be proven valuable. But even the most optimized approach will miss now and then. In the short run, that can be all critics need to reject the math.

Soccer

Subject to a rapidly growing body of analysis, soccer is notable for its massive differences from baseball. Often called the beautiful game, at its most aesthetically pleasing, soccer is often flowing with eleven players on each team moving in ways both predictable and unpredictable. The game rarely stops, creating movement patterns that have far fewer discrete moments to analyze than there are in baseball. However, the massive amount of money in the sport has led many to try to better devise optimal ways to build teams, identify future stars, and play the game in a manner that is most successful. Starting from a general discussion of soccer, moving to a background on analytics in soccer, and then analyzing the introduction and execution of the video assistant referee (VAR) and other rule changes demonstrates what can be learned about the process of optimization in soccer.

Soccer analytics are much newer than baseball and have largely been developed in the wake of the success of optimized approaches in other sports. One of the ongoing discussions about soccer analytics is that they certainly instruct about parts of the game and have been incredibly useful but there are also pieces of the game that, at least so far, seem unquantifiable. For many, this is central to the beauty of soccer. In the midst of an article about the difficulty players from the German Bundesliga have in adapting to playing in the English Premier League, Grace Robertson concludes by writing "I'd say let's come back to this in a year, but we still probably won't know. We may never know. If we understood just about anything about football, the sport would get boring pretty fast. Thankfully, that's not going to happen."[29] Although Robertson is incredibly well versed in soccer analytics, she is making the argument that the path to optimization can

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only tell part of the story of the game. Even better, the fact that the game cannot be fully solved is what makes it interesting. Contradictory data leads to debate and discussion, and it keeps all analysis of the game contingent. Instead of solving the sport, everyone gets to have their opinions about how it works. Those thoughts may be, perhaps should be, grounded in data, but the lack of certitude is what keeps soccer from getting boring.

In a similar vein, Ryan O'Hanlon closes a response to a question about what data has taught us about how to play soccer with the synthesis that "soccer is not even close to being a solved game in the way that it can sometimes feel like baseball and even basketball are. There's still so much we don't know about how soccer works; everyone, no matter their vantage point or background, would benefit from approaching the game with that in mind."[30] O'Hanlon is particularly well versed in soccer analytics, serving as both the proprietor of a successful Substack about soccer analytics, working as an ESPN columnist, and writing a book about how analytics have changed soccer, but his key holding is about the contingency that comes along with soccer analytics.[31] In his answer to the question he offers up broad precepts, like how data informed attacking set pieces, why teams should continue to play aggressively after they score a goal, the importance of expected goals in understanding scoring, and how pressing is generally successful, but all four answers lack definitive clarity. Attempts at optimization have helped soccer teams overachieve, but the state of analytics is far from solving the sport. Unlike baseball and basketball where dominant strategies are followed by almost all teams, strategic approaches in soccer are still shifting and evolving.

In an essay about how Italy beat England in the 2020 European Championships, O'Hanlon leads with a series of questions about what is actually valuable in soccer. Starting from the premise that "Of course, goals are important; goals are *the* most important. Score goals, stop your opponent from scoring goals, and you'll win a lot of games," O'Hanlon moves into a series of questions about how and under what circumstances various player traits and strategies matter.[32] He ultimately builds to a conclusion where he writes "You can get lost in the chain of events pretty easily, following it in either direction. Anyone who's absolutely sure about the answers to any of these questions is wrong, and it's why you'll often hear coaches and players speaking about the sport as if it were some kind of metaphysical pursuit rather than a game to be optimized."[33] Writing almost in conversation

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with this project, O'Hanlon contends that soccer is more than just a problem to be solved; it is a dynamic activity that can never be fully understood. Robertson and O'Hanlon are two of the leading soccer writers who employ analytics in their arguments, and although teams have brought plenty of soccer analysts on to their payrolls, it is notable that even those who deeply value how data analytics can help better understand soccer also stress the limitations of a data heavy approach. Although Bill James emphasized the importance of context and the places where sabermetrics did not fully represent baseball, soccer is a game that can be understood through attempts at optimization, but those insights are always contingent, and there are many missing pieces that do not port easily into numbers to be assessed.

With the giant caveat that all soccer analytics are partial, there is a ton of work being done to try to analyze soccer and build on the core precepts O'Hanlon identified as strategies to optimize play. Just as one of Bill James's initial problems in developing sabermetrics was the quality of the information retained about a baseball game, soccer analysis began with major issues in the amount of data being tracked in a game. The final score of a game is critically important in determining wins and losses, but it provides little value in developing a complex statistical analysis of the game. Richer information was needed and more began to be tracked. Soccer players began wearing devices that helped monitor how they were moving around the field, and cameras were installed to track spacing, movement, and where shots came from.

The flood of data led to the creation of a variety of statistics, like expected goals, or xG, which "is a way of measuring the likelihood of a shot becoming a goal."[34] Statistics like goals, assists, and xG started being tracked on a per-ninety-minute basis to show the impact that players who play fewer minutes may have on the game. Instead of simply stacking up contributions based on playing more minutes than other players, dividing contributions by the amount of time on the field helps show which players may be undervalued, warranting more playing time. Resources like smarterscout cropped up to give greater public access to data, allowing fans and journalists to complement their traditional assessments with data to back up or change their understanding of the game. So-called pizza charts visualize data to show off how players rate against their peers in critical areas of play, like progressive passing or defending impact.[35] The profusion

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of information facilitates the creation of new statistical tools, which leads to more data collection that can further refine understanding of the game.

As more data and discussion flooded into soccer analysis, critiques of key metrics cropped up. When expected goals took off as a metric, questions arose about whether or not it fully measured what was most important about tracking attacking soccer. After much debate, in advance of the 2021–2022 soccer season, expected threat (xT) debuted to the public as a way of better assessing how players were adding to the chance of scoring a goal. While expected goals focused primarily on shots taken, xT is an analysis of "what's the chance of scoring in the current possession based on where the ball is now?"[36] As players move the ball into more dangerous positions, they rack up xT , which can be tracked on a team-wide or individual basis. Analysts can trace who produces high-threat actions even if the athlete's contributions do not lead to a goal. This allows teams to identify players who may have potential in a different playing system or may excel with superior teammates. In this regard, soccer analytics have most clearly contributed to scouting and identifying potential players, finding optimal potential fits for a squad even if there is no single optimal way to play. The iterative tendencies of soccer analytics can lead to a better understanding of the game even if the sport remains a metaphysical exploration that defies attempts at straightforward optimization.

Scouting Soccer

Although soccer analytics do not produce definitive strategic approaches, data can be incredibly useful on the business side of the game. One of the key roles for data analysis is in sorting out players who are most likely to be productive when brought into a new team. With dozens of leagues to recruit from and hundreds of players to keep track of, soccer scouting is an incredibly difficult endeavor. With analysis, as long as teams get access to reliable data about games from around the world, they can crunch the numbers and identify a much smaller number of players to monitor. As one Premier League technical director put it, "data analysis is 1,000 per cent more efficient than traditional scouting, where you've got to drive somewhere or catch a plane, to see someone play for 90 minutes . . . and then they might not even play or they'll play in a different position or formation to what you're looking for."[37] Seeing the player for a single game is also

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limiting as they could have an amazing game that is out of line with their typical production or they could have their worst. In either case, traditional scouting is limited as it is a short-run assessment that can offer a perspective but is more accurate when complemented by the data analysis that can provide long-run information about performance.

Even with these acknowledged benefits of data analysis, the key is about having the entire organization in alignment about their value. When the whole club, from ownership to management to players, believe in using data in particular ways, it is easier and more impactful to enact changes based on what the analysis shows. In an article about how some of the best teams use data to inform decisions, Tom Worville writes that "the real edge when it comes to applying analytics, though, isn't how good your model is (although a bad model is worse than not having one at all) or how smart you are, but how you can get buy-in and have a real, direct impact on the course that your club is set on."[38] In this sense, data analysis is a complement to other parts of the organization. It can inform and refine, but soccer analytics are typically talked about as a piece of the puzzle rather than a determined, settled, approach. Unlike the three true outcomes of baseball or the openers the Rays use to overperform while spending less, scouting analysis in soccer is about working within the club as a whole and aiding in the direction of the organization. Baseball analytics tend toward settled and solved, while soccer analytics are more partial in part because of the trends in the sport, the level of data tracking, and some of the undefinable characteristics of the game.

Notably, it is not only soccer clubs who use data to inform their approaches. Increasingly, soccer players are using data analysis to make their case in contract negotiations or to help them pick a new club. In a piece that leads with the statement "Data's place in football is secured," Mark Carey reports how the Tranmere Rovers manager "highlighted the increased appreciation of data among his squad—however that may be delivered." The manager, Micky Mellon, said that "this generation of players do love numbers—if they're a '2' then they want to be a '3.'"[39] The profusion of data and data analysis has been accelerated by the fact that younger players have grown up with numbers and statistics to assess their play. Fueled in part by sports video games like *EA SPORTS FC*, which will be discussed in the next chapter, contemporary players are used to being quantified and applying data to achieve an edge in their performance and

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take their skills to the next level. As players accept the information and use it to improve, data use in soccer is increasingly normalized, generating the buy-in that helps analytics further change the game.

Beyond an overarching interest in making their numbers better, players also use data analysis in a manner similar to how teams use data to assess potential signings. In seeking a loan away from Arsenal to get more playing time, Hector Bellerin "worked with football data consultancy Analytics FC to help him find a suitable loan destination."[40] The data analytics firm worked up a list of teams that played in a manner that would suit Bellerin and also needed a player at his position. When Manchester City star Kevin De Bruyne was in the process of contract renegotiation, he and his agents contracted with multiple data analytics services to assess his play and recommend a compensation package. In an article about the process, Tom Worville wrote that "you probably didn't sense it, but the tectonic plates upon which the foundations of how transfers and contract negotiations within football take place shifted slightly this week."[41]

Moreover, Worville observed that football clubs are increasingly run as multimillion-dollar businesses and "players are now getting wise to their own value and how data can help prove that."[42] By using analytics, players can speak in a language that is already accepted by many teams, increasing the power of their case and helping them quantify their value on the field. Using analytics to scout for opportunities also helps them find the best landing place, decreasing their professional risk and aiding them in their careers. In cases like players using analytics to find what is best for them, analytics cuts both for clubs and against them. By spreading throughout the game, analytics make soccer a bit more of a science and a bit more perfect, and even the actual play within the game is far from solved. The fundamental tension between art and science is also at the center of a key dispute about optimization in soccer: the video assistant referee.

Optimizing Rule Enforcement

In the wake of many sports in the United States integrating some form of video replay, the Fédération Internationale de Football Association (FIFA) and other soccer-governing bodies turned to a VAR system to help make referee decisions more accurate. Concerns about video review processes are not exclusive to soccer but are often sharper there. The lack of a single

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governing organization or league also means that VAR is inconsistently applied, with different rules and practices in various leagues and games around the world. Like sports analytics, the ultimate goal of VAR is to get decisions perfect, to correct for the human error that leads to inevitable mistakes as human referees cannot get every split-second judgment call correct when players work at full speed. In effect, VAR is an attempt to optimize refereeing, to idealize it and eliminate error from the game. This is a different attempt to theorycraft a game and make it optimal since leagues try to solve the "game" of rule enforcement. Perhaps that is admirable in theory, but in practice the inclusion of VAR shifts what soccer is, ironing out variance in favor of conformity. Although analytics do not yet have soccer fully solved, VAR is designed to function similarly to the three true outcomes approach in baseball where what is right and "best" is not necessarily fun, and the whole process definitively takes a lot of time.

A primary tension with VAR is how it shifts how soccer works and who or what is in charge. In an article about how new rules and VAR impact soccer, Bill Haisley contends that "VAR fundamentally shifts the ontological frame from the human to the technological. . . . What happens on the field is no longer determined on the human scale of the players, referees, and fans in attendance, but instead on the cold, delayed, deceptively precise judgments from technology's vantage point. The privileged eye is the camera's, not the humans."[43] In a search for optimal decision making, human error is corrected for and emphasis is placed on how a decision is technically correct even if it is inhuman. The appeal of VAR is to perfect resolution as seen by the objective technological eye, but that certainty comes with its own biases. Rules that were made to be adjudged by humans, like offsides and handball, become artificially precise through a technological eye. The variance and beauty that makes soccer interesting and leaves Robertson and O'Hanlon waxing about how soccer cannot be fully understood is forced under a withering technological gaze that is constantly seeking perfection.

This precision is praised by some as a betterment of the game as the decisions made by VAR are de facto correct. Mark Ogden presents this position in an argument about how VAR may not be working perfectly but that it makes the game better. He writes "Things must change with VAR, that is clear, but VAR in itself is not the problem. Those implementing it in the Premier League are making it look dysfunctional because of the way it is being used, but the fans and players also need to step back and stop blaming VAR

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when it is getting decisions right."[44] Ogden's concern is valid and rests at the center of the goal of optimization. Is the point of refereeing to be errorless and perfect? Is it to do the best job possible and live with the mistakes that get made? The search for the optimal often uses technology to seek perfection, but those attempts have necessary externalities. In the case of baseball, the game slows down and homogenizes. In the case of soccer, VAR slows the game down, and the "right" call sands the edges off of the imperfect in a manner that decenters the human in favor of the technological. The implementation of systems like VAR privilege accuracy and correctness over fluidity, watchability, and what may be most fun.

The impact of this focus on perfection can be seen in several ways. Perhaps the first is the litany of famous soccer moments that would have never happened under a VAR regime. Diego Maradona's hand of God goal is surely to be ruled out,[45] but countless other goals would have likely been disallowed for offsides, and penalty kicks would likely have been given for many, many handballs. There are also unwritten rules that change, as the tradition of soccer was that a foul in the penalty area needed to be more significant to award a penalty kick since giving a foul there is almost tantamount to awarding a goal. The penalty box is rectangular as an artifact of historical design rather than a semicircle that would more accurately assess threats of scoring a goal at any given position on the field. This tension, where an unwritten rule is undercut via VAR since the system encourages the awarding of penalties regardless of the impact of a foul on the game, changes how soccer is played, especially when other historical elements of the game's design are not adjusted.[46]

VAR also takes time, slowing the game down in line with Steven Goldleaf's concerns about what sabermetrics does to baseball. Precision is time-consuming and the process of reviewing more and more decision is in tension with caring about the game. As Billy Haisley opined after a goal was overruled by VAR, the technology takes the experience of players, managers, and fans "emotional reaction to a thing they had seen and [in] making it null, committed an injustice to the entire sport and everyone who cares about it. *That* is an injustice that can never be remedied."[47] VAR puts caring about any action in a soccer match on hold. Instead of reacting to the moment, to the action, one needs to wait to see if there will be a review and then if the review will lead to a change. Even when your favored team is not the one who is necessarily wronged, VAR can lead to endless appeals

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from players seeking to see justice served, further slowing the game down. In the wake of a series of penalty saves overruled by VAR as the goalkeeper left the line early to the digital eye but not to the human one, Josh Tucker wrote that the conception of "right" "can mean many things, some of them deeply unsatisfying, and many of them less right than they appeared before being run through a series of ultra high definition video angles, back and forth, a dozen times or more. Beyond that, it's not clear that anyone considered situations in which it's been tacitly agreed that 'right' isn't all that important, or even preferable."[48] VAR is totalizing. It is accurate, but as Haisley put it, VAR centers the focus on the technological at the cost of the human. Optimization in refereeing may seem costless and good, but the technological eye cares little for the emotion of the game or the unwritten rules and practices that governed it for years.

In contrast to the introduction of VAR, there are rule-based changes that have made soccer better over time by disrupting what gets established as an optimal strategy. In the early 1990s the game often slowed down when one team took the lead and kept passing the ball back to the goalkeeper who would pick it up and waste more time. Banning goalkeepers from picking the ball up made passing to the goalkeeper riskier and increased the amount of time the ball was in play. Goalkeepers who could play the ball with their feet became more valuable, and more soccer tends to get played as a result.[49] Teams broke soccer by optimizing their approach to slowing down the action, making the game less interesting, necessitating the creation of this backpass rule. This rule change directly addressed the stalling and picked up the pace of play, much like the rule to require pitchers to face more batters in baseball. When the game centralizes around approaches that are troublesome, rule changes can help shift was is seen as optimal, revitalizing the game. Rule changes can go either way, advancing optimal approaches to play or disrupting them, and when they happen, it is important to reflect on the broader impacts they have on the structure of a game and how it works.

Soccer analytics is a growing field and is increasingly central to how teams and players go about the game. Occasionally venerated as a group that are more willing to question assumptions, analytics in soccer have shifted the game but are far from solving it.[50] At the same time, the debut of VAR is in line with an overall approach to try to optimize the game and make it more precise. That effort comes with costs, though, as time spent

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reviewing plays and the precision of the computer displace immediate reactions and the discretion of humans. Optimization leads to change that can make certain processes easier and more accurate, like scouting players or negotiating a new contract when you are an exceptional player, but being right is not always the same as being fun.

Lessons from Sports

Assessing the state of analytics in sports gives room to work through how analytics can impact games. First, individual sports teams and sports leagues are in a steady tension between what is best for the team and what is best for the league. From the three true outcomes to backpasses to unnatural shooting motions, teams have found edges that leagues believe take away from what makes the sport special. Routinely, the interests of the individual are in tension with the interests of the collective. Game developers would do well to think through how their games place players and groups of players in relationship to each other. Does an optimized approach serve all or marginalize some? Do player attempts at optimizing a game put them in tension with the developers? If so, is that a desirable outcome, or is it likely to cause problems down the road?

Second, as sports leagues depend heavily on viewership, they have a vested interest in ensuring the product they produce is aesthetically pleasing. Basketball had little reason to devalue the three-pointer as it can make the game exciting, so the widespread adoption of it can be seen as good for the game. However, when innovations in gaining an edge get darker and less favorable to the sport as a whole, leagues can take extreme measures to stamp those tactics out. From pressuring ownership to simply banning an approach, sports leagues are constantly patching their rules and norms with changes and adjustments. Sports may seem stable and consistent, but many of them make alterations in each offseason, rebalancing the game to make it more appealing. Games already use patches as a regular practice to fix bugs and adjust the game, but deliberately disrupting problematic play can upend the meta and make the game more appealing. The lessons from sports likely bear on esports leagues more than others as the common value of viewership shows the importance of mixing up nontelegenic approaches to keep fans watching.

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Third, analytics are really powerful and can dramatically change sports in a seemingly short period of time, but doing so requires high-quality data. When a meta approach shifts dramatically, it is likely to change the relative value of things as players who can do whatever is newly valued skyrocket, while those in the older style reach their nadir in relative worth. Properly assessing that meta requires good data as a common thread throughout sports analytics is that when the data is nonexistent or bad, the understanding of the game is highly limited. If games want to foster a theorycrafting community, they can provide data to help fuel analysis, while restricting access to certain kinds of information can disrupt a stable meta. Defense is hard to optimize across most sports because it is hard to assess, like how a game developer can limit access to key information to disrupt players ability to fully understand the game and develop a stable, optimal approach to play.

When individuals seek what is optimal for themselves, they often prompt common pool resource problems as they suck up resources that could be used more efficiently when shared. This chapter has given several examples of how those dynamics play out in practice in sports, but it is worthwhile to briefly work through how sports organize themselves. In the spring of 2021 several of the top European soccer teams announced plans to create a Super League and displace the existing order of European club competition. Fans quickly rebelled and the idea was largely shut down.[51] The most famous teams in the world developed the plan because they could make more money if the top teams all came together. Instead of having to share money with teams that did not draw as many fans or warrant the same kind of television contract, the most prominent clubs could split the spoils among themselves and shove the others to the side. This particular attempt at centralizing top teams was stopped, but similar events led to the formation of the English Premier League in the first place.

Additionally, in US college sports, conference realignment poses a similar kind of problem. The most famous schools are coming together in groups, spurning regional affiliations for nationwide consortiums that bring more large television markets into the next broadcasting or streaming deal to be negotiated.[52] In both cases the individual clubs or colleges are making decisions that are in their short-run optimized interest without regard to the impact on the whole. Even more complicated in the case of college sports,

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the decisions are largely made based on what is best for football programs and revenue rather than other aspects of the school, like travel costs, the education of players, or the best interest of other sports at the university.

Optimizing revenue is understandable, but it is also important to think through the downstream impacts of wringing out all the money one can. Games, particularly those that are free to play, can generate massive amounts of money, but are there points where they are acting more like the Super League and neglecting to think about the common pool resource problem inherent in focusing primarily on short-term money? Is it more important to get the most now or think about the future? And with that reflection in mind, it is appropriate to turn back to games, particularly two sports video games that make most of their revenue from in-game purchases and sport lively professional esports scenes.

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5 *EA SPORTS FC* and *NBA 2K*

Building off the analysis of the optimization strategies in sports, it is appropriate to turn to analyzing two of the leading sports video games. *EA SPORTS FC*[1] and *NBA 2K* are video game franchises that simulate professional soccer and basketball, respectively. They feature annual releases and are dominant games that have been produced for decades. *EA SPORTS FC* is the preeminent soccer simulation game and the jewel in publisher EA's portfolio of sports games. Although *Madden Football* outsells it in the United States, worldwide sales and revenue tilt heavily toward *EA SPORTS FC*. *NBA 2K* has an exclusive license with the NBA, so it is the only console basketball game that features players and teams that match those found in the NBA. Their status as premier titles, combined with the lack of competition for similar games, makes the development of the meta in these franchises fascinating as players take the analytical insights from sports and use them to break a video game.

EA SPORTS FC and *NBA 2K* are designed as simulation-style sports games as opposed to arcade-style games. The central intent of a simulation-style game is to replicate what happens on the playing field, offering video game players a chance to use their favorite teams and players to defeat the opponents they likely cheer against outside of video games. Sports games in this genre use name and likeness licenses with pro sports leagues, teams, and players to take what video game fans may watch on television or at the stadium and bring it into their homes. Players in the game are assigned ratings, largely based on what the game developer identifies as the skills they have shown in the previous season. The games are a big enough deal with professional soccer and NBA players that the announcement of ratings in the upcoming game are inevitably matched by players complaining about

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the ratings they were given and appealing for higher scores.[2] Player ratings and licenses are a key part of creating the reality in the simulation, and with the growing graphics power of consoles and PCs, the games increasingly look like their sporting counterparts, even down to the in-game advertising.

The link between the video game and the sport is a key part of the simulation. In a piece for *The Athletic*, video game sociologist Garry Crawford argues that the reciprocal link between the video game and perception of the sport matters. He says the following:

> Perhaps an easier way to think about it is quantification. My son talks about Adama Traore being the fastest footballer in the world and he doesn't mean it in the way fans used to mean it: to him, it's not an opinion, it's a fact—because it's in FIFA.
>
> The game has put a figure on things fans just used to argue about, without ever expecting an answer. And there is a wider point here about gamification: during insecure times, putting values on things gives people a sense of security. It is reassuring to know that something or someone is better than something or someone else.[3]

EA SPORTS FC is a so important within the culture around soccer that it shapes opinions and perceptions about players and their skills on the pitch. Attempting to simulate a sport within a video game requires representing the players in numbers, and should the game rise to a notable enough profile, those numbers no longer merely reproduce what is seen on the field: they also shape how players are perceived. This relationship is part of why players care about their ratings. Many of them play the game, and they also know that fan perceptions of them can be based on how they are represented in *EA SPORTS FC* or *NBA 2K*.

Beyond the impact of player ratings, the two games are thoroughly dominant in the marketplace. Konami's *Pro Evolution Soccer* limped along for years before it attempted a free-to-play model and largely fell apart under the weight of *EA SPORTS FC*'s dominance. EA had their own basketball title for years, *NBA Live*, but it withered as *NBA 2K* thrived. As of this writing, the last version of *NBA Live* to be published came out in 2018, but the game has not been a true competitor to *NBA 2K* for over a decade.[4] Both competitors largely suffer from the fact that a sizable part of the value of a sports game is the community of players to play against. *EA SPORTS FC*'s and *NBA 2K*'s dominance cast a massive shadow on other games in their sports as without enough other people playing, the games just do not have a chance to

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grow and create a vibrant community. Add in technical issues, glitches, and subpar graphics, and competitors to the dominant sports games are operating at a significant disadvantage. Although *EA SPORTS FC* and *NBA 2K* are largely rehashes of the same game each year, they benefit from a high level of polish since what is released each year benefits from a decade-plus of development time.

To sell games each year, however, *EA SPORTS FC* and *NBA 2K* routinely seek to add something new and interesting to each version of the game. For *EA SPORTS FC*, this can be adding a new game mode, like the addition of street-style soccer mode VOLTA, while *NBA 2K* focuses on adding a new story mode to the single-player version of its annual releases. TreaAndrea Russworm wrote an excellent critique of *NBA 2K16*'s effort at distinguishing itself by having Spike Lee write and direct the single-player narrative. She writes about the computational blackness embodied in Lee's story arc, arguing that his conservative storyline both disrupts and reaffirms perceptions about blackness.[5] Culturally, *NBA 2K* is so notable that it can attract top talent from outside of video games even if that talent may not fully understand what they are getting themselves into.

The two franchises have overwhelming similarities as behemoth sports games that sell millions of copies annually. They have pushed out their competition, giving the titles monopolistic control of the simulation-style space for soccer and basketball. There are other soccer and basketball games, but they generally lack licenses or focus on the management side of the game, like *Football Manager*, a soccer management simulation that is accurate enough to actually used for scouting.[6] As *EA SPORTS FC* and *NBA 2K* have grown and the terrain around video games has shifted, both franchises now rely on online multiplayer modes as a key way to sell new titles. By moving players online, there is additional pressure for players to pick up a copy of the new version so they can move along with the community of other players. For *EA SPORTS FC*, that push comes in the Ultimate Team mode. In *NBA 2K*, players take the player created online in MyCareer to play against other people's avatars. In both cases, optimizing the game often means turning what is ostensibly a simulation into a game that bears little resemblance to its offline counterpart. Theorycrafting in these sports games takes the analytic trend from sports and amps it up, crafting players and playstyles that are designed to take advantage of the loopholes and design flaws of a video game in search of the optimal way to drub an

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opponent, even if the approach bears little resemblance to the sport the game is ostensibly simulating.

Understanding the impact and development of the metagame in this pair of sports games requires discussing the key modes of each game and how they work. After articulating the key parts of each game, from how online play works to how players are encouraged to spend money to aid their pursuit of dominance, it is possible to turn to an analysis of the meta. *EA SPORTS FC* shows how computer code encourages a dominance of physical stats, making some players stars in *EA SPORTS FC* while they are more pedestrian offline and rendering some of the most famous players in the world virtually unusable in *EA SPORTS FC*. *NBA 2K* focuses on physical attributes as well, but it also twists game play as shooting is amped up and teamwork is devalued. However, understanding how optimization works in *EA SPORTS FC* and *NBA 2K* requires foundational knowledge of the games themselves.

EA SPORTS FC: The Game

Debuting in 1993 under the title *FIFA International Soccer*, Electronic Arts has published a soccer game for decades. The publishing pattern solidified around annual releases, although there have been a few additional games to mark World Cups and attempts to launch new spin-off games, like *FIFA Street*. In 2023 Electronic Arts rebranded the game as *EA Sports FC* due to contract negotiations for the license to the *FIFA* name falling through.[7] Notably, this change has relatively little impact on the game, other than the sea change to the title, as the rights to individual players, teams, and leagues are handled in separate negotiations.

The game play in *EA SPORTS FC* is built around a handful of modes. Players can play one-off games between two teams or engage in practice to improve their skills. There is a career mode where players can develop as a manager, choosing a team from any of the licensed leagues and then managing that squad through its league and tournament play. A player career mode focuses on developing an individual, where the person behind the video game controls seeks to establish themselves in the world of international soccer. VOLTA is a newer addition, added in *FIFA 21*, and puts players into smaller squad, street-style matches that can take place either online or off. But the cash cow for Electronic Arts is the Ultimate Team mode.

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Ultimate Team originated in *FIFA 09*, but it was only a shell of what would come. Over the years, the Ultimate Team spread beyond the *EA SPORTS FC* franchise into other EA games, like *Madden* and their other sports franchises. The point of Ultimate Team is to build your own soccer club, complete with players, uniforms, and a stadium. Soccer players are divorced from the teams they are part of in traditional soccer and are rendered in playing cards that video games players collect by purchasing card packs they earn through play or buy with money. The specific dynamics of the packs have changed over time, but in 2021 Ultimate Team modes brought in over $1.62 billion, which was 29 percent of all the revenue Electronic Arts made in the fiscal year.[8] In 2022 EA did not break out Ultimate Team revenue specifically but emphasized that revenue from purchases was still robust.[9]

To play Ultimate Team, players need to buy a copy of *EA SPORTS FC* and then either play hours upon hours to earn currency for packs or spend real-world money to buy premium currency. Particularly savvy players engage in arbitrage on the in-game transfer market to make in-game revenue, but filling out a team of high-end players is either luck dependent in getting the best cards from a series of random packs or labor dependent by accruing enough in game currency to pluck top choices out of the transfer market. That process is expensive enough that the $60 cost of the initial game is less than what many Ultimate Team players will spend on premium currency and packs.[10]

With a vibrant Ultimate Team, players can either play against the computer or, more often, take their team online and play against other people. The pinnacle of Ultimate Team is Weekend League or FUT (*FIFA* Ultimate Team, the mode's abbreviation before the debut of the *EA Sports FC* title for the franchise) Champions.[11] Each year the framework changes a bit, but the general design is that players seek to qualify for Weekend League in matches throughout the week. If they qualify, they then play against other qualifiers throughout the weekend and get rewards based on the quality of their performance.[12] Rewards throughout Weekend League tend to be quite good, which is a key part of the motivation to play for qualification during the week and then grind out matches on the weekend. Top players get particularly rich rewards, improving their club and putting them into an even better position to do well in subsequent weeks. The overall design of Ultimate Team also feeds into this pattern as better versions of player

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cards are rolled out over the course of the season. New card types and packs give Ultimate Team a power creep so that the cards dominant at the end of the season typically were not even in the game at the beginning of it. By increasing the power of cards, players are given a reason to keep playing as standing still means that the quality of their team will degrade in comparison with those who are playing consistently.

Similar to, but different from, the professional Overwatch League (OWL) as run by Blizzard, esports in *EA SPORTS FC* are more fragmented, but there are also ties to professional sports. There are standalone *EA SPORTS FC* tournaments, and EA partners with a number of other entities to further *EA SPORTS FC* esports competition.[13] The international soccer organization FIFA sponsored a FIFAe World Cup, and US soccer runs an eMLS league.[14] The soccer organizations generally use the esports competitions to hype their sport and use the Ultimate Team mode as the core of their play. Esports around *EA SPORTS FC* centers Ultimate Team as the core competitive game mode, encouraging top players to congregate there, drawing additional attention to that style of play, and pushing more players to a mode that generates outsized revenue for EA and sets the terms for what is viewed as optimal. Esports, through streaming and YouTube, also advances and solidifies the meta as amateurs can watch what the pros are doing and try to emulate it.

It is also quite interesting that unlike a traditional sports competition, Ultimate Team mode enables multiple video game players to use the same soccer athletes. That overlap, combined with a well-established meta, means that two video game players can roll out basically the same squad because, in the search for optimization, many top Ultimate Team squads congeal around the same core players. *NBA 2K* is a bit different though. Players are still funneled into opportunities to pay and advance, but online play focuses on individual, seemingly novel, created players.

NBA 2K: The Game

NBA 2K has many of the same game modes as *EA SPORTS FC*, where there is the chance to play one-off games between two teams. The massive success of Ultimate Team led to the creation of the MyTeam mode, where players collect cards, quite like in Ultimate Team, in an attempt to build the best basketball squad. *NBA 2K* is notable in that it has an increasingly

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fleshed-out WNBA mode, enabling players to play the premier women's basketball league. But much of the focus in *NBA 2K* is on the career mode, MyCareer, and what players can do with their own player.

The first step in MyCareer is designing the future NBA player who will serve as your avatar.[15] There are an array of design options, ranging from ones that will impact how your player performs on the hard court, like height and weight, to solely aesthetic ones related to physical appearance and cosmetic elements like hair color and style. Players start out with some basic decisions, choosing things like their name, intended position, height, and weight. The next step, which can be by far the longest, is to design how your player will look in the game. Developer 2K Sports added a face scan option, where players can use an app to upload their own face into the game. Whether or not you choose to upload a face, there are a veritable ton of adjustments one can make to all kinds of sliders to make the player appear as desired. Later, additional options in hairstyles, clothes, and the all-important tattoos give players a chance to further refine their representation in the game.

After sorting the key cosmetic elements, players are faced with a set of choices about their avatar's skills. There are general decisions to make where there are trade-offs, like strength versus speed, and others where players set the caps for their attributes in key areas like three-point shooting or standing dunk. Based on their attribute design, players will eventually be able to unlock badges that make their player more talented, aiding in their ability to make clutch shots or dunk over smaller opponents. The overall process of designing a player can take hours, and there are plenty of guides online that break down popular builds or model ways to match famous NBA players.

After building a MyCareer avatar, players move into the main game. Each year there is a new central narrative, but the general framework is that players start early in their career, likely either in high school or college, and then need to perform well to move forward. By playing in games, players get Victory Coins, or VC, to improve their avatar's skills. Spending those VC takes avatars closer to the caps set in the player-building process and, in combination with solid in-game play, will eventually help unlock badges. Based on the performance in those early high school or college games, "scouts" notice the MyCareer avatar, and players are either more sought after by NBA teams or less so. Performing well in the lead up to the NBA draft can often make the avatar a top draft pick, increasing the salary the

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player earns from playing in NBA games and helping them accrue VC more quickly. Games are intercut with cutscenes that tell an overarching story that generally runs through the first NBA season players complete. Heavily loaded toward dialogue in the early season, the story arc has generally been about either an unheralded player moving toward stardom or a college star facing adversity then overcoming it through the quality of their play on the court. There are press conferences and possible trade demands as players work through both NBA games and the scripted storyline to further define their avatar while establishing their presence in the NBA.

Concurrent to the narrative in the game, players can dip their toes into the online version of MyCareer where players use their avatar to play in basketball games against other players' avatars. There are an array of game modes, from five-on-five basketball to two-on-two, three-on-three, or even one-on-one. 2K Sports has increasingly built out the mode, with *NBA 2K22* on next-generation PS5s and Xbox Series X featuring an open-world environment called The City. The larger virtual space in The City led 2K Sports to include a series of quests and a longer story to chart the avatar's growth in the NBA. Doing better in games and completing quests can help establish the avatar as a fashion maven, rap star, or both in the world of *NBA 2K22*. Success lets the player move from one apartment to another before eventually getting to the penthouse and rocking a zip line across the city. Should the player win Rookie of the Year or MVP, their likeness appears on billboards throughout their version of The City, letting players celebrate their rise. There is also plenty of opportunity for customization as players can get new outfits or modes of transportation, like skateboards or bikes. The best, most exclusive options tend to cost the most VC, putting players in the vise of choosing to improve their avatar's basketball skills or sharpen up their its appearance.

The online mode is the center of play for many as it lets players test themselves against others. Online play is also a key driver behind developing your player since getting VC to fill out their attributes and chase badges are needed to make them more complete. Everyone with the game and an internet connection can play online, but players are marked by a tag that shows off their user name and overall rating. Moving from a low starting rating toward the top rating of ninety-nine helps differentiate players online based on their potential quality. A top rating does not tell everything, but a low one can lead others to avoid playing with you, as

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they prefer to seek out those they suspect are more talented. Taking a page from many other games, the online modes of *NBA 2K22* and *NBA 2K23* take place over roughly month-long seasons, where players progress through a number of levels based on how often and how well they play online. Each level confers some sort of benefit, most of which are cosmetic. Earning those exclusive, top-end cosmetics is an additional way that players can use their avatar to signify their skills to everyone around them.

Although the card packs in MyTeam have not taken off like what is found in *EA SPORTS FC*'s Ultimate Team, the center of additional spending in *NBA 2K* is on VC. Players can earn them in the game by playing well and finishing games. However, grinding forward that way means that an avatar will languish at a low rating for an exceptionally long time. And most years, 2K increases the VC grind by requiring additional coins for leveling up key attributes, slowing the accrual rate of VC from games or by doing both at the same time. Of course, there is a shortcut. Bundled with premium versions of the game and sold as an additional purchase, players can buy VC directly to leap their way forward. They still need to use their avatar to unlock a higher rating as the game will not allow them to jump straight to the maximum, but dropping an addition $20–$40 additional on a start-up avatar will help players move through the beginning of the game far more easily, helping them succeed and lock down their avatar's status as a top draft pick with a higher salary.

This upcharge to a premium title is cited in reviews each year as objectionable, with the Kotaku review from *NBA 2K22* describing the game as "a shakedown disguised as a basketball game that is growing as tired as it is exploitative."[16] VC allow 2K Sports to effectively increase the price point for the game. Players who want all the cosmetics can likely spend an almost unlimited amount of money, but even those looking to get a decent foothold in the online game may need to add money to the purchase price to have a decent starting avatar.

The esports scene in *NBA 2K* is dominated by the NBA 2K League, a partnership between the NBA and Take-Two Interactive, the publisher of *NBA 2K*.[17] Many of the teams in the 2K League are connected to NBA franchises, and matches are broadcast on Twitch and occasionally on sports networks like ESPN. Borrowing from traditional sports, often there is a draft of players and special events or group games to identify the players who will fill out the various esports squads. The league has generally increased

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options for amateurs to play pros and built a framework around the game for players to participate in high-profile showcases to establish themselves as future professionals. Similar to *EA SPORTS FC* esports, the techniques and approaches of professional esports players bleed into the online version of the game. Unlike *EA SPORTS FC*, players cannot copy the whole opposing squad as they only embody their singular avatar. What they can do is copy the build of professional players and mimic their playstyle, solidifying the meta through a homogenized approach to play.

Understanding the basics of these two games, including their financial schemes, is a key piece of critiquing how the meta in the games is formed and what the practice of optimization means for play. Part of the incentive for developers is crafting a game that can encourage players to spend additional money, but the game has to have enough hooks to warrant the spending and keep things interesting. What is particularly notable about these sports video games is how the emergent metas share key pieces in common with sports but are also quite different. That said, each year key parts of the meta of a sports game are pretty well understood before the game even launches.

Optimizing *EA SPORTS FC*

The *EA SPORTS FC* meta is based around Ultimate Team, which means the cards that represent players in traditional soccer are vital to the makeup of an Ultimate Team squad. Instead of placing the emphasis on play style, the focus typically rests on how to build a squad that sets players up to stomp their opponent. One of the key parts of an Ultimate Team squad is the chemistry rating. Team and player chemistry is determined by placing players on your squad in their desired positions and with players who are in the same league, on the same team, or from the same nation as other players in your squad.[18] Although the specifics are far enough into the weeds that only a high-level view is really necessary for this analysis, what chemistry means in practice is that squad building requires prospective managers to think through how they can assemble a group of players who fit together. Teams with less than fifty out of one hundred team chemistry will see their ratings drop, while those above fifty will have them improve. Maxing out the chemistry is so vital that the modifier can turn "a Silver card into a Gold, or a standard Gold into a top-tier, in-form rare card."[19] For top-tier

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competition, maximizing results for team chemistry is virtually required, and chemistry narrows the universe of players who are relevant to teams. As one example, since France has a number of high-level athletes across the field on their national team, French players are more highly sought after than those from nations who cannot make as many high-level links with potential countrymen.

The details of building an Ultimate Team start with chemistry, but there is more to be done. Managers need to find players to fill out their team, designing a formation that suits both their playstyle and the players they have available to them. A robust online community of YouTubers, Twitch streamers, and standalone websites offer guides and advice about what players are in the meta and how to build out a team.[20] Players considered in the meta vary somewhat over time as new cards are released that have better statistics than the original ones. Some cards are also modified based on form, where the way that a player is performing in their professional league impacts the ratings on their card in FUT.

Websites like FUTBIN offer up a cornucopia of knowledge, breaking down what players are popular, offering advice about team building, and providing examples of successful squads.[21] FUTBIN has its own app for both Android and iOS where players can explore building a squad and monitor the prices for different cards. The information on these sites can be inscrutable for those who do not play FUT, but they are written for insiders, those looking for the edge to help them do a little bit better in their next game. The advice and resources found online help players optimize their approach, identifying the cards they need to add to their squad while pushing them to follow the established meta to continue to improve. These resources work much like the analytics departments in professional sports teams, helping to hone and perfect their approach by advancing a way of thinking about the game that establishes a homogenized best way to play.

The meta in Ultimate Team is composed of a combination of squad building and actual game play. If one is not particularly good at playing the game, then the best team is unlikely to help much, but a key differentiating factor for high-skill players is the quality of their squad. In a guide to the *FIFA 22* meta, Pavo Jurkic writes that the "*FIFA 22* meta consists of several factors, including players, formations, custom tactics, and raw gameplay."[22] Notably, the game play comes last on that list as it is a necessary, but not sufficient, condition to meta-level play. Managers need to assemble the best

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team in a quality formation for the play within the game to begin to matter; the roots of the meta are in what happens before the game starts and then reach into the game as some tactics are more powerful than others.

One of the keys to the meta in *EA SPORTS FC* is that it does not really change too much from year to year. Subtle adjustments are made, and certain techniques may be more or less effective, but Luke Roberts writes that "the meta is usually fairly similar across different games, with subtle differences and players adjustments accounting for switches in the most popular players used across the majority of squads in Ultimate Team."[23] The relative stability means that players can move from one year in the franchise to the next without it upending the game since the changes tend to be relatively minor. That stability is reinforced by the reliance on professional players to demonstrate what works. A list of key tips for excelling in Ultimate Team states "Watching pros is a quickfire way of learning the new mechanics of the game as well as finding out the META (most effective tactic available). This meta will guide you through *FIFA 22* and will definitely get you that extra win in FUT champions."[24] By centralizing professional players in the identification and adoption of the meta, key tactics spread throughout the community as viewers learn the way they "should" be playing. Professional players play with high stakes since underperformance can lead them to lose any contracts they may have and will prevent them from winning tournaments. Copying their styles homogenizes the game, guiding players choices by limiting their options.

The centralization of play is a key concern about the meta as many players argue that the meta in *EA SPORTS FC* is boring. In a post on the official *EA SPORTS FC* forums, one poster argues that the game drags and is based on defensive play because players "sit back deep and spank long balls all game."[25] Defensive play is rewarded since if you do not let any goals in, you cannot lose. Plus, the poster laments that "as the year goes on they will get even better OP [overpowered] defenders and the life will be sucked out of the game."[26] The meta is not about pretty, interesting, or dynamic play; it is about winning. And playing by the meta is not about doing something your opponent will appreciate; rather it is about finding a way to beat them, which may very well be based on sucking the life out of the game. Beyond the playstyle, the squad-building function is often boring. In an article predicting players who will be meta in *FIFA 22*, Marco Kilian writes "It might be kind of boring if everyone in FUT competes with a similar squad, but

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meta players make gameplay so much easier. Can you blame them? Every FIFA pro uses these players in the Weekend League or at official events, so why wouldn't you use them as well?"[27]

Focusing on the Weekend League, Ben Sledge makes a similar point: "The other unbearable part of Weekend League is the teams you face: they're all practically identical. If you've played in even one this year, you know the score."[28] Sledge goes on to name the lineup, dominated by French players or players on French teams to boost chemistry with the only variety being "up top" since those selections "depends on how much money they've [players] spent in the game."[29] Kilian and Sledge concede that the meta is effective and there is a reason managers congeal around the same players, but the dominance of particular players and strategies limit choice in the game, sanding off variety and pushing players to conform if they are seeking to actually compete.

The homogeneity of teams often leads to antipathy and acceptance. Ben Wilson's guide to the *EA SPORTS FC* meta begins with the acknowledgment that "everyone loves to hate the *FIFA 22* meta. Yet its success speaks for itself, with huge numbers of elite *FIFA 22* players relaying on names such as Timo Werner, N'golo Kante, and Alphonso Davies. Want to take the 'can't beat 'em, so join 'em' approach to Division Rivals success? You've come to the right place."[30] Framing the meta as a bad thing, but one that players need to adhere to is fascinating. Wilson makes the argument that players know the meta is not fun, but you should choose to use it anyway since your opponent will use it against you. This sort of messaging is central to problems with optimization as the optimized approach chases its own tail until players accede to it regardless of their personal interests. If you want to win in *EA SPORTS FC*, it is going to be a whole lot easier if you also use the approach others have already established as the best way to play the game. A Reddit post to this end contends that the discovery of the meta can break the game as an approach that was aesthetically pleasing and fun to play gets replaced by a more efficient strategy that is more in line with the affordances of the game and how it is designed.[31] When players find the meta and it gets a hold on play, then players relentlessly copy it, turning what was a series of interesting choices into a repetitive script in game after game.

Although tactics and specific players in the meta can vary somewhat from year to year, there is a consistent hallmark of the meta that reigns supreme: pace. The pace on a player card determines how fast a player will

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run. Pace is exceptionally important throughout the team since if a manager has their players outrun the opponent, then they are more likely to be open on offense and also able to cover for any mistakes made on defense. Opting to play with less pace on the squad is tantamount to giving your opponent a license to run circles around you. Wilson's guide to the meta includes the advice that when picking players it is all about "pace, pace, pace. No matter how hard EA tries to tone down the effect of individual speed, it's still the priority for most competitive FUT squads."[32] The subtitle of David Luff's preview for *FIFA 23* is "Pace will be key once again" and then the guidance that "although we don't know what the gameplay will be like for *FIFA 23* just yet, one thing will surely be a guarantee—pace will be king. If your Ultimate Team is to survive in the early meta, then pace will be the key attribute to look for, with everything else secondary."[33]

Moreover, in a lament about quitting the game because of the meta, Travis Yoesting starts from the premise that he likes to replicate "the real-life action in a video game" but in Ultimate Team "there's only one type of player worth using: The fastest."[34] Yoesting points out that the centrality of pace is part of the game's design since "EA Sports can't figure out how to make slower, technical players perform better than faster, less technical players, so gamers just flock to anyone with a high sprint speed to succeed."[35] Pace is meta because the game is designed in a manner to reward speed. Even without details of an upcoming version, Marco Kilian writes that while it is difficult to know what the meta will be, "you can always be quite certain of this: Players with a lot of pace—no matter which position they play in—are more popular and are used more frequently than slower players. So, if you wanna look at it this way, they are always meta. Everything else remains to be seen, you just have to play the game yourself to get a feeling for it."[36] The root of the *EA SPORTS FC* meta is stable from year to year since how fast a player can run is central to how valuable they will be in FUT. With every opponent stacking pace, players will quite literally not be able to keep up unless they do the same.

As a manifestation of the focus on pace, certain athletes in Ultimate Team are far more valuable in their digital manifestation than they are in the games *EA SPORTS FC* ostensibly simulates. In the 2021–2022 English Premier League season, Timo Werner was a striker for Chelsea. Any player for a top Premier League side is quite talented, but he was limited to twenty-one matches and only scored four goals with one assist. At Chelsea, he was

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a rotation player, one option among many for the squad. In FUT, however, he is a mainstay. Ben Wilson reflects "Fed up of playing against Timo Werner (ST, Chelsea, 84) online yet? Me too, or at least I was until I picked him and realized he's worth the hype. Ratings of 91 pace, 81 shooting, and 82 dribbling make him *FIFA 22*'s most meta striker card, and he definitely feels OP [overpowered]. Dropping 7,100 coins on the German is good value at this point in the cycle."[37]

The relatively low overall rating, eighty-four, is fairly in line with Werner's status in the Premier League, but it is trumped by the underlying ratings, particularly the pace. Luke Roberts writes that "although he took a small downgrade from his 2021 *FIFA* rating, Timo Werner is still a truly meta *FIFA* player—one that's arguably better in-game than when playing for Chelsea in real life." The primary reason for Werner's prominence in *EA SPORTS FC* is that he is "the fastest *usable* striker in the English league."[38] Players with speed and some key elements are at the core of the *EA SPORTS FC* meta. Although the game is putatively a simulation, the game design means that physical skills are at the core of what makes for a good player. As Wesley Yin-Poole puts it in a review of *FIFA 22*, "and for all EA's efforts to slow things down, a player's pace, power and balance are paramount—as they have been for years. It's why, in Ultimate Team's auction house, Chelsea's much-maligned speedster Timo Werner costs twice as much as Spurs and England star Harry Kane, who in the real world is one of the best strikers in the world."[39] The way the video game is designed puts physical traits at the center of the meta, the one key holdover from year to year. And in their efforts to optimize their efforts and trounce their opponents, Ultimate Team managers reduce the video game to its biggest flaw: the primacy of the physical attributes over all else.

Two additional features linger around the edges of the meta and the impact of the game's design. First, the dominance of the meta means that cards that fit into it have more value and are better at retaining their worth throughout the game. As a guide to trading Ultimate Team cards puts it, "people want to use the most META players in *FIFA*. That's just a fact! Early in the *FIFA* game cycle there's not many META options for people's squads. Meaning players that are, always have a high value."[40] The guide goes on to note that a meta card may not have the highest overall rating, but "cards from the popular leagues with a combination of stats that make them amazing in game" are meta.[41] The value these cards hold means that even if

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a player is not chasing the meta, they are impacted by it since the structure of the in-game economy is warped by the meta.

Additionally, the design of Ultimate Team means that *EA SPORTS FC* continues to release new cards for players to collect during the year each version of the game runs. Travis Yoesting notes that "this makes sense to some extent (it allows folks with great teams to keep getting better, giving everyone something to work toward), it takes away some of the fun of playing with base players. It's like adding a remote-controlled car to a set of Matchbox cars."[42] The constant power creep of cards keeps the chase going and can spur additional purchases as players need to continue to add to their collection so they do not fall behind. Power creep both serves the immediate financial interests of the game by giving a reason to keep spending and moves the goal posts for players as their team is never a finished product, incentivizing ongoing play. Even when the overarching meta does not shift, the addition of a newer, faster card can make what was on your squad outdated.

Centralized around pace and chemistry, the *EA SPORTS FC* meta is remarkably stable from game to game. Particular strategies may vary somewhat based on what changes in game design are made with each entry to the franchise, but the importance of physical stats has been a hallmark of the series. Popularized and then stabilized through professional play, the *EA SPORTS FC* meta limits the game, giving players a single best approach for everyone to chase. Even if they hate it.

Optimizing *NBA 2K*

The meta in *NBA 2K* has some overlap with *EA SPORTS FC* but is also somewhat different. The primary split between the games is that the focus of *EA SPORTS FC* play is on the team-based FUT, while *NBA 2K* is largely organized around the single-player-driven MyCareer. *NBA 2K* players are not assembling a squad; they are building their own player and then taking that avatar out to play with and against others, putting the focus on their lone individual and how their player fits within the *NBA 2K* meta. There are two primary aspects to the *NBA 2K* meta: how players build their avatar and the best strategies and tactics for multiplayer games.

The most vital piece to the meta in *NBA 2K* is the initial building of the players' avatar. Although many different approaches can be taken to build

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a usable player, being able to excel online is largely contingent on selecting attributes and investing in skills that will help your avatar thrive against others. Players who stick solely to the single-player mode can make different choices, but simply winging it is likely to lead to an avatar that will routinely fail online. Picking the right height is vital as being taller matters for rebounding, blocking shots, and shooting over an opponent. However, being shorter opens up more speed, which helps point guards bring the ball up the court and navigate around slower, bigger players. There are a ton of ways players can choose to use their potential attribute points, but investing in the "wrong" ones will hobble the avatar and make playing successfully much more difficult. Attributes also unlock badges at certain levels, and those badges dramatically improve an avatar's abilities. A well-designed avatar will greatly benefit from the right badges even in single-player games. Neglecting to carefully work through avatar design and investment will put a cap on how well the basketball will go, while acceding to the meta and following advice will put the player in a strong position to step online and play against other people.

Fortunately, plenty of guides exist to help instruct players on how to build out their avatars. Instructions start out based on the position the player wants to play, like point guard or center, and then often get a bit narrower based on the intended style of play being sought. Guides home in on attributes like pass-first creators or glass-cleaning lockdown defenders. Players can choose a path where their primary scoring will be at the basket or from the three-point range. Online resources abound with guidance about what attributes to focus on and how to get the badges an avatar will need to be successful. YouTube is a hotspot for guides, with a visual breakdown of what the creator is selecting as they talk through the rationale behind their decisions.[43]

As the meta in each version of the game evolves slightly, guides take the dominant meta into account in their builds. For instance, Connor Knudsen's guide to a playmaking shot creator "differs slightly from others you might see floating around. Key distinctions being that this iteration has a slightly larger wingspan and invests more in Defense [sic] than others might."[44] More wingspan increases the avatar's reach, improving their chance of finishing at the basket and rebounding at the cost of some of their shooting skill. Investing more points in defense is a straightforward trade-off since points spent in one area cannot be spent in another.

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Knudsen explains the rationale for the adjustments, writing that the tweaks are "meant to help players fit into the meta more clearly. Perimeter Defense is key for guards trying to keep up with, well, this build. So having some yourself can be of huge help."[45] Knudsen's design is a subtle adjustment to what is dominant, responding to what is considered meta and fitting within expectations while seeking to counter other players doing pretty much the same thing.

Perhaps the most interesting guide to getting players into the meta game of *NBA 2K* is the subscription site NBA2KLab.[46] Featuring some basic information for free, like recommended builds and some basic comparison tools, the site has a premium option that lets players test various jump shots and coaches them on improving their skills. The site moves into depth beyond what is generally offered, with a game to practice shot releases and detailed information about what kinds of animations players should choose to improve their shooting. The site tracks performance in the *NBA 2K* League, keeping statistics similar to what one would find on a traditional sports site. The popularity of the Lab can be seen on its YouTube page, which has over three hundred thousand subscribers, and features detailed discussions about how *NBA 2K* works. The NBA2KLab builds on the kinds of sports analytics found in traditional sports, studying what happens in the game and advising on how to do things more effectively. In the case of *NBA 2K*, that comes down to how players build their avatar, from the kinds of animations chosen to help players get their shot off quickly and consistently make shots to basic statistics about aspects of the game. Videos break down the various timings of animations, testing the game and its features to find the optimal way to play by finding what works best in the game and what parts of the game are broken or available to exploit.

Building out an avatar is the first step to entering the *NBA 2K* meta, but after sorting out the traits of the athlete to be used, players have to step on the hard court where they will be fully exposed to optimized strategies. In lamenting what it is like to play with random players online and witness the meta, one Reddit user writes the following:

> It blows my mind that there are people who really can sit on their couch all day and just dribble spam back and forth and chuck shots and not get bored of it. Like all the zig-zagging, all the running backwards to the three point line, all of that stuff I just don't understand how people can even do that and not instantly get bored. Even more mind blowing are the legions of glass cleaning locks and other

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> builds who will willingly play with those people and spend the entire game standing in the corner doing nothing or setting a screen just to catch a couple dubs [wins] on 2k watching someone else dribble spam all game.[47]

Frequently, the dominant approach to most of the games players will find online looks little like traditional basketball. Playing with a traditional style, featuring ball and player movement, takes massive amounts of coordination. This is nearly impossible to achieve with a seemingly random assortment of avatars assigned to your team. So, many of the ballhandling builds are based around speed, and players run around, back and forth, to try to get a small opening to shoot. Similar to how pace is king in *EA SPORTS FC*, in *NBA 2K* using an extraordinarily fast player means that they can get open against slower opponents. Additionally, the speed helps them capitalize on any mistakes made by their foes as one slip up can lead to the attacking player popping up wide open. Online lag can also be a problem because any slowdown against a quick player can result in them hitting a shot in your face.

The meta that emerged in *NBA 2K* does not look like a traditional basketball game, and as it has become stable over years of releases, it limits options for players who want to play online. The ability for players to shoot at absurdly high rates in comparison with traditional basketball is a primary factor that warps the game. As one Reddit users writes, *NBA 2K* does not "reward creativity. i [sic] can't even blame the community that much for just wanting to jack threes and have the same flat-footed jumper and copying each other's badge load outs when 2k will let you go 20/25 from 3 every game."[48] The success of the meta limits players' choices: they can chase the meta and do the same thing as everyone else or they can lose. The same post ends by stating "it just makes me sick there's no individuality almost every player/team plays the same."[49] Ultimate Team in *EA SPORTS FC* leads players to start the same lineups because the approach has been shown to be successful. In *NBA 2K* players build their avatars with only subtle differences and select that "flat-footed jumper" because the animation is fast and predictable. Instead of variety, the meta in *NBA 2K* prizes sameness even if the approach is in tension with thinking of the game as a sports simulation.

The stakes of an avatar's build is furthered strained by how players get the necessary points to develop their player. Although starting a new avatar is something that players can do as much as they would like, actually building that avatar out and developing them costs Victory Coins, the currency

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in the game. VC can be earned through playing in dribs and drabs, but that slow rate of accumulation will do little to make the avatar competitive for a long time. Although the specific amount of VC needed to max out an avatar varies somewhat, it generally takes about 400,000 VC to fully develop.[50] There are sales to be had, and players still need to play the game to unlock attributes, but they can speed their development by paying about 100 USD for those VC. If a player wants to try a second approach and engage in a new build, that is another 400,000 VC they need to complete that avatar.

The price makes the stakes of getting the build right the first time quite important since failing to do so will mean that all investment is lost. As Connor Knudsen puts it in a follow-up article to his post about a guard build, "many have found and replicated a build referred to as the Demi-God that has run rampant through *2K22*, so, maybe these players have a point? But, in the face of such a lopsided meta and with players having already spent the extra money to achieve these builds, what can be done from here? That much is up to devs [developers]."[51] The fact that money is often required to advance avatars means that players feel pressure on their decisions, encouraging them to accede to what they believe is best so that they do not waste their money or time. The investment also makes it quite difficult for developers to unwind or adjust a troublesome meta in *NBA 2K*, as nerfing speed and making it less powerful would leave those who built and developed a demigod with a substantially worse avatar and a substantial sunk cost.

Beyond the specific player builds and the cost of rerolling and changing one's avatar, players express substantial concerns about how the meta has led to a stale, uninteresting online game. After breaking down a four-step plan to win that summarizes the meta approach to winning games, one player writes "It's just so . . . Gross. I've told my friends that I'm not playing team pro-am anymore because once you get to a high enough level they're all the same. There is no ingenuity. There's no 'Skill' involved at all. If you're hiding behind a screen running left to right with the left stick and then greening when you get a favorable screen animation, how is that skill?"[52] They continue to argue their point, contending that "you win some and you lose some even with a full squad. My concern is mainly that the way to dominate is so far from real basketball it's offensive."[53]

The meta that has emerged in a video game version of basketball has precious little to do with the optimized approach that has solidified in the

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traditional form of the sport. The affordances of the video game shift play as players seek out the edges and weak spots in the game's design. Shooting in the video game is much more likely to be successful than in the traditional sport, so players respond accordingly.[54] The meta in *NBA 2K* typically centers around exploits in the game's animations as players use herky-jerky movements the game cannot properly track on defense to get open.[55] Additionally, with resources like NBA2KLab breaking down the details of shooting animations, all players can readily adopt a quick, virtually unblockable shooting form that actual basketball players would have to train for years to reach proficiency and will never be as successful in the NBA as it is in *NBA 2K*. In *NBA 2K*, getting a new animation is often merely a matter of choosing the right attributes in a build guide and then spending the requisite VC to unlock the new move.

The centrality of the MyCareer mode, combined with the ability to develop and advance a player, has created monsters that game developers cannot tame. Connor Knudsen writes that "*NBA 2K22* is a game that has become all about the build for your created player, getting badges and stats to line up perfectly in order to make the game feel almost like a science. These badges allow players to shoot unreal percentages from deep, steal the ball in a wild fashion, and pull of[f] other inhuman plays."[56] In making the game more like a "science," players have effectively crowdsourced the key to the test that is *NBA 2K*. Cooperating online, they have probed and prodded for weak spots in the game's design and animations, identifying optimal ways to play even if they have little to do with the sport they are supposedly simulating. Optimization has become a way to make your personal play better while breaking the game for the community of people seeking to play it.

The game's developers are far from helpless in trying to sort out how the game is played, but they do face notable obstacles. As problematic play emerged, developers tried to stamp it out, changing the game to make gameplay a bit more like traditional basketball. In *NBA 2K22* developers patched the game to address "exploits with quick left and right bursts—the infamous 'zig-zag cheese'—that has been contributing to a homogenised, unrealistic style of play."[57] In this case the use of the term cheese refers to a kind of move that is not illegal but is generally looked down on by people in the community. Cheese is seen as an exploit, a way of poking at the game's design to find an unintended result. In this case, bursting back

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and forth from left to right made the player virtually unstoppable. Repeat the action enough times and the player becomes wide open to take a shot.

However, the community often pushes back. As one player notes, "you see, this wasn't the first time that the *NBA 2K* devs have tried to address cheese post-release. There have been other nerfs and buffs to counteract the cheesers, and attempt to improve the gameplay experience. The problem is that there's a tendency to walk back on those measures, in order to appease complaints."[58] A strand of the community around *NBA 2K* are change averse, particularly when they have invested in developing an avatar for the current meta and honed their playstyle to suit it. Rolling back that investment is difficult and runs into fierce opposition. Even if the cheese that has been found is not intended, changing it to develop a new meta or add variety into the game is quite tricky.

In *NBA 2K* the structure of the game and how optimization plays out in practice often comes back to money. The prominence and cost of VC gives players incentives to be quite careful about how they spend their time and premium currency. Research into the game can help develop an optimal build and playstyle, but as more players do the same, they homogenize the game around approaches that are designed to play *NBA 2K* well rather than to simulate basketball. The goals of players, developers, and simulation are in tension as optimizing for any of them pulls away from balancing the other elements. Increasing cost and microtransactions in the game leads players to seek exploits and cheese. Having players invest more time and money in their avatars limits developers' abilities to address that cheese in patches that would devalue players' existing investments in building ideal avatars. Simulating actual basketball may lead to a less interesting game and could result in less spending on VC. Optimization bends and twists the game as individual player interests do not generally line up with the goals of the community at large or the developers of the game.

EA SPORTS FC, *NBA 2K*, and the Meta

Similar to the process of optimization in other games, metagaming in *EA SPORTS FC* and *NBA 2K* homogenize the game, leading players to common conclusions and approaches. In *EA SPORTS FC* players chase the same set of cards in Ultimate Team, favoring pace and other physical attributes over ratings and reputation in the broader soccer world. *NBA 2K* focuses on

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individual avatars as players develop them in line with the expectations of the community to maximize their success on the court. In both cases the process of optimizing individual play is in tension with the stated goal of the game to provide a simulation-style experience. For those players seeking an edge, optimizing a sports game often means turning away from the traditional sport and how it is played. Much like the foundational holdings of sports analytics that promoted defensive shifts in baseball and three-point shots in basketball, a theorycrafted sports video game shifts and transforms under the weight of players seeking an advantage. That optimal approach often relies on the gaps in the game's design, from the overall emphasis on pace to the gaps in animation that can be exploited with aggressive movements the developers may have never tried to exploit.

The metagames of both these franchises also hinge on the role of money in the game. Ultimate Team is a cash cow for Electronic Arts, and VC are a frequently reviled addition to *NBA 2K* that can double the revenue generated from the game's sale. These additional options for spending allow the game companies to increase revenue since per-user spending can skyrocket past the cost of the annual title. Both franchises typically come with multiple options for purchases, as premium editions of the games come with free packs to start up an Ultimate Team squad or VC to boost your MyCareer player. The monetary interest for game developers is clear but pushes players toward optimization so they do not waste their investment. The inclusion of additional surfaces for spending amps up tension between players and developers as it becomes harder to change the game since any change would devalue the spending already committed by players. Friction also arises around a desire to spend less by optimizing more. For example, players may turn to theorycrafted strategies to try to be successful while minimizing their expenditures. Knowing the valued and valuable approaches helps players fit in with expectations, further establishing the meta as the dominant way to play the game on a budget.

At both the highest level of professional play and in recreational online play, *EA SPORTS FC* and *NBA 2K* routinely solidify around a singular search for a quantitative best metagame. Instead of encouraging players to explore and find multiple interesting and successful ways of playing, the player community descends on a new title with the intent of solving the game and breaking it down to its component parts. This sharpens the common pool resources problems that often accompany attempts at optimization, as

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players complain plenty about the dominant meta but do little to change it. Players decry the lack of realism or the unrelenting sameness of play but are left with the choice to either quit playing, lose more, or simply join the optimal approach. Expectations of the proper way to play beget a meta that quickly becomes stagnant in both games as players either use the optimal approach or play the game in a harder mode than their opponent. Optimization in *EA SPORTS FC* and *NBA 2K* limits choice, reducing the vast array of possible options into guides to follow and tactics to use and making vast amounts of the games functionally irrelevant. Part of what drives the design of both games is the additional routes for monetization, a trend that is even more transparent in free-to-play games like *Clash Royale*.

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6 *Clash Royale*

Launched in March 2016 by Finnish game developer Supercell, *Clash Royale* is a billion-dollar-plus mobile game title that blends aspects of collectible card games and multiplayer battle arenas. Its presence on mobile devices makes the game particularly interesting when it comes to questions of optimization as the norms and incentives of play are different on mobile devices. Players are more accustomed to free-to-play monetization schemes, and play tends to revolve around frequent, shorter bursts of play. These games are also intended to last for years, which means developers have to find ways to keep play both fresh to ongoing players and accessible to new people just starting out.

Clash Royale is an extension of the universe established in Supercell's *Clash of Clans*, with a mythical set of beings waging a comical war with each other. *Clash of Clans* plays the battle out over the course of massive, timed raids between attacking and defending force. Players set up their defensive bases and attack the bases set up by others. The innovation of *Clash Royale* was to take the fighting element and make it more like a multiplayer online battle arena game, with each side defending fixed towers while attacking their opponent. The innovative mechanic in the game was to have players determine their attacking forces based on cards they collected, making it a mashup of two well-established genres, battle arenas and collectible card games, both of which are well suited for mobile devices.

One of the key parts of making *Clash Royale* work on mobile is the monetization strategy underlying the game. Designed as a free-to-play title, primary revenue from the game comes from a general pressure on players to level their cards. Although the specifics have changed over time, players need to collect thousands of copies of common cards to level them up to the maximum level of fourteen, with future development of the game likely

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to bring additional levels. Cards gain power as they are leveled up so that a player with underleveled cards is at a disadvantage to those who have maxed out their arsenal. As players level their cards, they gain experience and their defensive towers are leveled up to aid their defense. Collecting cards can be done in a variety of ways, but the primary method is by winning battles and getting chests as a tribute to victory. Players can hold up to four chests at a time, and they open based on timers, with more lucrative chests taking longer to open than more common ones. Should they wish, players can spend the premium currency in the game, crystals, to speed up their chest timer.

After collecting the requisite number of cards for an upgrade, players can choose to spend gold, the common currency, to upgrade their cards. One of the first pinch points players will find in the game is that there simply is not enough gold to be had to upgrade all the cards, leaving them with the option of focusing on certain cards or buying premium currency to open more chests and buy more gold to upgrade their cards. Over time, the monetization loops have shifted somewhat, primarily with the introduction of season-long battle passes that last about a month and offer rewards for playing the game, but the central monetization hook is getting players to spend money to level up their collection of cards. And that limited, restricted access to cards is at the heart of optimization in *Clash Royale*. Faced with more than a hundred options, yet limited in what they can practically pursue, players who optimize their choices can move through the game more smoothly. Those who finally get their collections in a solid state face another challenge from the game's developers: regular updates that shake up the meta and give everyone new cards to chase.

Ongoing games as a service, like *Clash Royale* and many other titles, also have a central tension in their optimization as both players and developers are effectively optimizing against each other. Players are frequently seeking an optimal outcome through managing their scarce resources, while developers are looking for ways to optimize spending and keep the income from the game flowing. In the case of *Clash Royale*, the game can borrow from longstanding practices in both genres of games it grew out of. From battle arenas, the game pulls plenty of focus on cosmetic spending, like emotes and slightly different appearances for cards, and from collectible card games, like *Hearthstone* and *Magic: The Gathering*, it borrows the debut of new cards as a reason to keep collecting to build out a quality deck.

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Clash Royale: The Game

Like any collectible card game, the heart of *Clash Royale* is in deckbuilding. The game initially soft launched with forty-two different cards divided over three rarity levels: common, rare, and epic. Shortly before the worldwide release, the game added six new cards and the legendary rarity level. Over the next six years, the development team continued to add cards to the mix, and as of this writing, there are 109 cards in the game, including five cards designated as champions. Champion cards were added in November of 2021 and built off the design of heroes in *Clash of Clans*. The assortment of cards offers players an immense variety of options in constructing their battle deck. Although a handful of special modes have been added to the game with different rules, the core gameplay has each player construct a deck of eight cards to take into battle. Most battles last three minutes with a two-minute sudden death overtime if the match remains tied. Players place icons representing their cards on the field of battle, and the action is simulated through the game from there as players have little interaction with the cards after they are played.

The core mode of *Clash Royale* pits two players against each other on a battlefield. You are always assigned as the blue player, defending the bottom and attacking the top, while your opponent will see you as the red side at the top of their screen. Players place their cards on the battlefield, and then the cards take shape, moving according to the rules for each card, setting up as a building, or doing damage as a spell. Elixir is the determining factor for what can be played at any given moment. Each card has an elixir cost, and players steadily generate elixir over time. Although there are several game modes with different rates of elixir generation, the default mode slowly grows elixir for the first two minutes of the match and then doubles that rate for the remainder of the game. Defenses are set around three towers, two princess towers flanking a king tower. Knocking down a princess tower generates a crown, while taking out the king tower ends the match and awards three crowns. Whoever has the most crowns as time runs out wins the match unless one player ends things early with a three-crown victory. Players can augment their defense with additional buildings that are time and damage limited or through the strategic placement of troops. Ultimately, the core part of the game has stayed the same since it was launched even as additional game modes, cards, and tweaks have added depth to the game.

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As a game that has been running continuously for more than six years as of this writing, changes and inclusions have been made to build out options for players and keep the game lively. The addition of roughly month-long seasons facilitated the selling of battle passes and the distribution of greater rewards to help players continue to progress their card collections. New modes were added, from basics like two-on-two to modes where a card from the game would regularly pop up on each side of the battlefield to mix up standard play. Clan Wars was added in April 2018, which gave groups of players a chance to do battle against other clans. Events celebrated non-traditional modes of *Clash Royale*, like draft or sudden death mode, while tournaments gave the opportunity to compete against others in a contest where everyone had the same level cards and defensive towers. Clan Wars 2 debuted in late August 2020, replacing the original version and adding a twist that has driven monetization for the last several years in the game: incredibly straightforward incentives to level more cards across a player's collection.

Because it is a card game with more than one hundred options, the total possible combinations of cards is enormous, but players only need eight cards to form their deck for battle. This puts a soft limit on what they are likely to spend on the game. If they really only seek to specialize in a group of eight cards, they will be able to max out their options relatively quickly and never need to spend again. Adding new cards can complicate things as a new card may prove more versatile or interesting and lead players to chase that card. However, Supercell also pursued a more direct path toward encouraging players to level cards. Over time, more modes of the game allowed players to use cards at higher card levels. In the case of the change to Clan Wars, players went from a system where they did not need to have too many cards in their personal collection leveled to one where they needed four full decks of eight cards and would see a substantial advantage in battle if all thirty-two of their cards were maxed out. Routinely rewarding players for building out a versatile set of options for deck building keeps players chasing something and gives them reason to keep spending money and time pursuing the next shiny object in front of them.

A second way that *Clash Royale* encourages players to level up more than just a basic deck of eight cards is through their regular balance patches. Although the cadence in the early years of the game was more erratic, the game has fallen into a pattern of adjusting cards along with each season.

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Cards are adjusted up and down based on usage and how effective they are in play. Most cards are subtly adjusted with nerfs or buffs in order to dampen their effectiveness or make them more attractive relative to other options. Occasionally, a card will fall far enough out of favor or become so powerful that a rework is in order. Reworks generally change a fundamental part of the card, altering how it functions in the larger game. In an answer about design intention, one of the developers wrote that "we aim for every rework to land right on the 50% win rate margin but that may not always be the case. We want a rework to come out on the strong (but not too strong!) side of the meta, or else a rework can feel pointless or lack impact."[1] Making a reworked card slightly more powerful is likely to draw more players to it, taking a place where no investment is warranted and turning it into a spot where it may be one of the most attractive investments for a player's limited amount of gold.

Clash Royale offers up an immense amount of choice for players, but like many collectible card games, the game's design consistently pushes players toward broadening their collection and leveling all their cards. Unlike the situation in Ultimate Team or *NBA 2K* where specialization and focus are rewarded, breadth is a key part of building a strong deck in *Clash Royale*, which also aligns well with the monetization strategies in the game. The game added challenges to encourage players to get cards to level 11, introduced a level 14 king tower that requires experience gained from leveling cards to get players to fill their collections out, made the change to Clan Wars to spur players to get cards to level 14, and then included mastery levels and rewards for achieving masteries to prompt players to use all of their cards. Developers also have the option to continue to add additional levels to cards, offering an ongoing treadmill for players to run along by playing the game while offering them more reasons to spend money on the game.

This rounded approach to cards, in combination with regular balance adjustments and occasional reworks, makes the meta in *Clash Royale* far less stable than in other games. There is a push to find what is best, but whenever that best settles a bit, developers shake up the game leading to the search for a new meta. Shifting metas serve the economic interests of the game, giving players a near-constant next thing to chase. *Clash Royale* players consistently complain about the meta, as whatever is dominant is to be reviled, but the quick turnover to a new meta means the concerns

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consistently shift. The only real constants are the inevitable complaints about what is meta now, the inexorable push to develop more cards, and the search for what will be meta next.

Optimizing *Clash Royale*

A key piece of optimization in *Clash Royale* is that it is highly time limited. Although all the games and sports discussed in this book have metas that have changed over time, those changes tend to be slow. Stomping out the GOATS meta in *Overwatch* took over a year and required a fundamental change to the structure of the game with role locking. Sports make rule changes in an attempt to create a highly watchable product but typically only change rules between seasons, which means any meta will likely last for at least a couple of years or more. *EA SPORTS FC* and *NBA 2K* ebb and flow as players figure out what will work and what does not, but major changes are typically only made to fix urgent issues or in between versions of the game. *Clash Royale* has made roughly monthly changes for years.

The regular pace of alteration means that subtle adjustments can be made and then either amped up or reversed should they prove to be too much. The consistent, predictable schedule also creates expectations within the player base that the next season will lead to a new patch, and although it may not be known what will be changed, it is understood that things will be altered in the coming patch. This foundation of shifting sand underneath the meta means that if you hate what is going on now, you might favor what is coming next, or at least you will not be stuck in the current state of things for too long. The time-limited premise of *Clash Royale*'s meta is fundamental to understanding how the game works, but several other pieces support the development of a meta each season.

The foundation of every meta in *Clash Royale* is the deck of eight cards that players take into battle. Selecting from more than one hundred options puts players in a position where their individual choices matter greatly. As the primary bound for the game, the deck and the cards that come in it shape how any player fits within or resists the meta. As the Pocket Tactics guide for the game states, "*Clash Royale* looks like a simple game from the outside. Two players drop units onto the battlefield, and watch as they try to destroy the opponent's towers. But *Clash Royale* decks are surprisingly complicated. There may only be eight unit cards in each, but in many ways

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this actually requires your deck synergy to be more focused and precise. There's little room for error in good Clash Royale decks."[2]

Because there are only eight cards in the deck, finding cards that work well together and can counter what potential opponents might do set the terms for engagement with the game. As certain cards are seen as more powerful or versatile, they can begin to dominate the selection process, establishing an optimal way of playing the game. The interactions between the cards in a deck are important, with a *Clash Royale* guide by Excalibur claiming "Most decks are built around 2 or 3 cards which synergize very well on offense. The other cards are made to support that synergy. Now, look at your deck. Does it have a combo that synergizes well? If not swap out cards to make a good synergy."[3] The point of making a deck is to find a group of eight cards that can perform well together and defeat the opponent. Selecting the right mix of cards is vital as the cards in a deck are the core means by which players interact with the game.

However, the deck is not the only part of optimizing *Clash Royale* for players. They also need to be able to play cards skillfully. Often the difference between two players will be found in how they place cards and how quickly and precisely they can execute their actions. Remembering what cards your opponent has and what order they will come up in can separate a decent player from an excellent one. Judging how much elixir your opponent may have and accurately predicting what they are going to do can be a key piece of winning a match. The core point is that even with a meta deck, players need to be able to play it effectively for it to matter. As Shaun Savage writes in a list of meta decks, "keep in mind that while the decks listed below should all perform well, they aren't always going to have a favorable matchup or end up needing to be played in a certain way. Just having the "best" deck isn't going to guarantee you a victory. You will need to learn how to play it in general, and then understand how it functions against specific matchups to get the most out of it!"[4]

Certain metas or specific decks in *Clash Royale* interact somewhat like rock, paper, and scissors. If a deck that depends heavily on an aerial assault runs into a deck without enough air defense, the air attack is likely to quickly overrun their overmatched foes. Slow-building decks that depend on the additional elixir at the end of the game may not make it there if they are matched up against a quick strike deck that claims a three-crown win in the opening moments of the game. The meta in *Clash Royale* depends

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on the deck that is being rolled out, the player's skill, and the opponent's deck and skill. Although player skill impacts optimization in all games, the quick turnover in the meta of *Clash Royale* means that when things change, players need to adapt and be able to fluidly use cards they may not be as well versed in. Practice with a variety of different cards dramatically helps improve the ability to play with them, but switching to a new deck, even if it is part of the meta, can be quite the experience.

Further, Savage's point is that simply picking a deck off of a list does not mean that it will work for every player. Players need to find decks that are strong and also cards they know how to play well. The quick turnover in metas means that knowledge of a previous, weaker deck according to the meta may still win out over a shiny new deck that is more in line with beliefs about what is optimal in the game. The deck a player chooses, how familiar they are with how to play it, and awareness about how to counter the moves of others are central considerations in the optimization of *Clash Royale*.

Beyond the abundant deck guides and videos breaking down what makes up the meta at any given time and debates about what impact changes in the game will have on what is dominant, there are several key websites that help keep players informed about what is most powerful. Deckshop.pro, StatsRoyale.com, and RoyaleAPI scrape data from the game and compile it into a series of deck lists, charts, guides, and data to inform players' decision making processes.[5] Using these websites can quickly instruct players about what combinations are working best in various modes and help them track their own performance. There is information about the rewards coming up for the player as well as usage and win rates for cards to help inform decisions about what to level up next. These largely automated resources offer quick information about what is part of the meta right now and how to build a deck with proper synergy.

The presence of these sites factors into how quickly the meta can spread in *Clash Royale* since players can see in nearly real time what is working and what is not. Adjustments can be made, and the results will then be fed back into the databases, producing updated knowledge about what is working best after any balance changes or in a special mode of the game. The quick turnover in metas makes sites like these particularly important to theorycrafting as everything can change with the adjustment to cards each month. With only a few weeks to play under a certain meta, if players are

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going to track what is optimal this month, they will likely first pick it up by either getting smoked by it in a match, via a YouTuber hyping the new thing, or on websites like these.

The process of how the developers change the game also feeds into how players can figure out the optimal approach at any given time. Typically, a few days before changes will be launched on the live servers, the game developers circulate information in the game and on relevant websites about the changes being made.[6] When they initially began these posts, they simply listed the information they were changing with an indication of the direction of the alteration, whether the card was getting stronger or weaker.[7] Typically, a variety of influencers in the community get test versions of the new build so that they can produce videos and guides about how the changes will impact game play.

Over time, the developers added short narrative statements to contextualize the change being made and help explain what they were seeking. For instance, in a nerf to the move speed of the Archer Queen during her special ability from medium to slow, the developers wrote "the Archer Queen remains strong in the Arena . . . maybe a bit too much. By reducing her move speed during her ability, it won't be as easy for her to reach a Tower and will lessen her bridge spamming potential."[8] The additional context speaks to the developers' intended outcomes and what they are looking for in changes to the game. Reading among the tea leaves, these statements indicate the general direction the development team is headed in and what they think about various cards. Instead of simply announcing the changes, the context adds transparency and lets the developers help shape the meta through how they talk about various cards and strategies.

The narrative also lets the development team put the current change in context to past alterations, indicating the game's future and what they are looking for in assessing the state of the game. In June 2022, in advance of season 36, the development team announced work-in-progress balance changes for the first time. The team was not yet set on what they were going to do, and a couple of notable alterations were in the mix, so they asked players for their opinion. As See-ming Lee writes on RoyaleAPI, "these balance changes are intended for June but are not finalized yet. During this weekend, *Clash Royale* creators will be streaming developer builds and show you these balance changes in videos and live games so YOU can comment and provide feedback to the *Clash Royale* team before the team finalize the

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changes for the June season."[9] Feedback actually led to the alteration to one of the changes as players spoke out against it and the development team adjusted accordingly.

One formative event for how the game is patched came in the wake of season 3, about three years into the game's lifespan. Seasons debuted as a way to break the game into sections and, following in the wake of battle passes in games like *Fortnite* and a number of other games, to add something to the game that players could spend money on every month.[10] Seasons led to a solid balancing cadence as well, letting the development team adjust cards with each new season. In season 3 a card called Executioner was reworked, and the team "reacted to pre-release comments about the Executioner's strength and did an emergency nerf with much less playtesting than usual (no time for a formal playtest cycle) before the start of Season 3."[11] In advance of a competitive esports tournament, the development team did an emergency patch to revert some of the nerf to Executioner and adjust Fisherman as well. The midseason change led players to complain in the next season about the strength of two cards, Witch and Wall Breakers, with hopes of another midseason adjustment, but during the season, Wall Breakers fell back and Witch became even stronger. The run of the whole season gave more information about how to adjust the statistics of cards going into season 5. As Reddit user Supercell-Seth put it,

> this month we opted to let it play out—while multiple cards are very powerful, the saving grace of the season is that it *IS* multiple cards. If it was just one card in 60% of games, the calculus might be different. But there are dominant decks without Witch or Wall Breakers. There are dominant decks without Elixir Golem or Fisherman. Even if all 4 of those cards are a notch above in power level, they are playing off each other and creating a meta of their own. We feel comfortable letting that ride out for 2 more weeks and doing our best to get it right in one change that arrives on schedule.[12]

Through the over-nerfed Executioner, the development team discovered that they needed data and substantial playtesting before making major alterations to the game. What seems powerful at one point may be strong primarily because players do not know how to handle it, but when it becomes more successful, players find a counter on their own. That dynamic adjustment by players, in combination with the short turnaround between seasons, means that Supercell can gather information, make adjustments, and then keep the cycle going in a relatively predictable way. At this point,

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players generally know that strong cards will be nerfed and weak cards will be buffed every few weeks, a pattern that suits the greater interests of Supercell in ensuring players have a reason to upgrade all of their cards.[13] A key part of managing the meta in *Clash Royale* is the clear, consistent message that change is coming.

Supercell's intent is to keep the meta moving and adjusting each season, but players often have a different relationship with it. The meta in *Clash Royale* forms in part around data on the websites that scrape for information about winning and losing decks, but there are plenty of other factors in play as well. YouTube influencers, professional players, and streamers can show off what is particularly powerful and how to play cards in novel ways. Deckshop.pro can provide a player with a meta deck, but that does not mean they will know how to play it. Watching a professional player in a tournament with the same deck can give players ideas about how to execute the necessary strategy, even if most players do not have the intuition or skill to pull off all of the moves.[14] Like the other games in this book, one consistent theme from players is to complain about whatever the meta is at a given time. Specific details of complaints vary, but some focus on the limited number of cards they see in their battles, arguing that it is boring to play against the same decks time and again.[15]

Others respond to concerns of sameness by arguing that there will always be a meta in games like *Clash Royale*, with one Reddit user arguing that "people play ladder because they want to win. Meta decks are the most strong decks in the game and you have a much higher chance of winning If youre [sic] playing with a meta deck."[16] Ladder is one of the most competitive type of *Clash Royale* play and was split into two options, Path of Legends and Trophy Road, in October 2022. Players are nominally matched up against opponents who have the same ranking and then gain or lose their position on either option based on whether or not they win or lose the match. The Reddit poster also encourages players who want to encounter something outside of the meta to play in one of the game modes where wins and losses do not matter nearly as much, encouraging them to concede that players will optimize their approach when there are stakes in a match.

Developers have a slightly different view about how players see the meta. As the ones in charge of designing or adjusting it, they have personal stakes in what players think. And as Reddit user Supercell-Drew put it, "for as long as we started doing balance changes, every balance change has been

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the 'worst ever', every meta is 'the worst meta ever' to somebody, and we have a responsibility to the player base to make informed decisions using the data and tools at our disposal rather than make kneejerk reactions to opinions or posts that get traction. . . . Even if these posts and opinions make great points (which they often do) we still want to take time to do things properly."[17] The stakes in a meta are different for Supercell and for players. Some players are always likely to be unhappy with the state of things, particularly in moments where their preferred approach is made weaker. In this post, Supercell-Drew appealed to Supercell's central interesting in keeping the game balanced and doing things "properly." Players and developers have different interests, and while it is much easier for players to complain, developers are not necessarily incentivized to develop the best, most interesting meta. Although individual developer interests may vary, the overall interests of Supercell are more aligned with keeping players playing and spending money in the game. The constant turnover in meta means that players will also only be complaining about any given meta for a short period of time before it will be a new group of people complaining about the next one.

Clash Royale and the Meta

As a free-to-play mobile game, the overarching design of *Clash Royale* is somewhat different than the other games in this book, and that has a major impact on how the optimal strategy for players develops. *Overwatch* is a premium title with cosmetic items for purchase, and *Overwatch 2* uses battle passes and cosmetics to generate revenue. Sports seek to sell tickets and television packages; their primary goal is typically to drive viewership. *EA SPORTS FC* and *NBA 2K* sell virtual items, player cards, and VC as well as a premium title that launches every year. Each year, progress in both sports games resets as the new title comes out. *Clash Royale* seeks to hold players for years, keeping them active and finding ways for them to continue to develop their collection over their entire run of the game. It is notable that the free-to-play mobile game is the longest-running single video game analyzed in this book. If the optimal strategy never changed in *Clash Royale*, players would only need to develop a handful of cards to be successful. Instead, mixing the game up and adding modes where players need more

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leveled cards gives them a reason to keep paying, stay on the treadmill, and prepare for whatever shifts and game modes will come next.

Clash Royale is also different in the stakes of any given match. Even in one of the most competitive modes, Path of Legends, the importance of any loss is relatively small. In high-level play, professional play, and certain game modes, a loss can be incredibly damaging, but for most players, any given match is a modest time investment and a chance to move on to the next thing. Matches in *Clash Royale* last a fraction of the time of one in *Overwatch*, and the cumulative investment in a nerfed card is far less than your *NBA 2K* demigod becoming a mere mortal. Optimization matters and players surely seek the best way to win, but the constant changes erode the ability to have a single, stable best answer. Supercell developers routinely undercut the meta, keeping it from rooting in and giving players a chance to see something new and regularly reinforcing expectations that change is a constant in *Clash Royale*. Combined with the lesser stakes in a given match, the costs of choosing not to optimize in *Clash Royale* are lower unless a player is one of the few playing at the top-end of the game.

Supercell has also decentralized the meta by including a number of game modes that are radically different than the core match. For example, two-on-two play is not ranked, so it is more like a recreational mode than a competitive one, and 7x or Infinite Elixir mode is wild, with players able to constantly place cards and matches generally ending with one team destroying the other in dramatic fashion when their opponent can no longer keep up with the devastation. Another example is Skeleton Dragon Invasion, which features Skeleton Dragons randomly popping up on each side of the arena and joining the battle. The random deployment and steady increase in the number of Skeleton Dragons means that the mode resists any sort of straightforward optimization.

Moreover, even certain cards, like Graveyard, have an inherent randomness built into how they work, undercutting the ability for players to find a single best way to play the game. Randomness resists optimization as no one quite knows how things will play out, and however it does, the ultimate result is not entirely because of anything the player did. The opportunity to bounce back and forth from one mode to the next and to regularly find relatively quick matches means that the stakes of any battle are lower than investing in a singular path forward. Maxing a card certainly takes

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resources, and maxing eight takes more, but overall the game is designed to regularly disrupt obsessing on what is optimal.

Clash Royale does have moments when it approaches common pool resource problems. The game can get stuck in certain valleys, with a single approach dominating over multiple seasons. The vast number of combinations for players makes the meta's stability less certain though, as do the regular patches to adjust the value of various cards. The game resists a single, best answer, giving players a variety of higher and lower stakes game modes that push them to develop across their collection of cards, leading them to have more options as the meta changes. The combination of needing both skill and a proper deck is not a unique feature of the game, but the wildly different approaches needed for various decks means there is plenty of information to learn to hone a new approach.

The variety of *Clash Royale* is largely fueled by its economic model and design decisions, but the impact is to destabilize a single, ideal way of playing. There is rarely a best approach to the game as it generally rewards emergent, exploratory play or simply sticking in a lane and playing what the individual enjoys since the deck you face can matter more than the one you use. The relative lightness of the matches takes the sting off the meta as well since resisting it can be done in recreational modes or even on ladder with relatively low stakes. *Clash Royale* rewards exploration and flexibility as it encourages players to be fluent with a variety of approaches to the game. Developing a full roster of cards will take a lot of time and can be done through spending a lot of money, but the meta in *Clash Royale* is rarely as dominant as in the other games analyzed in this book. Players do seek to optimize, but the game's design frustrates attempts to find a single best way to play.

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Conclusion: Don't Drain the Pool for the Rest of Us

Attempts at optimization reach far beyond games and into many facets of life, often causing problems in areas where the search for the optimal leads to skewed results. In just about any situation where there are choices and potential rewards, people can seek to optimize their practice, from finding a driving route to a laundry or cleaning routine. The underlying subcurrent of many of the self-help guides and life development advice is about figuring out how to optimize life. Marie Kondo's KonMari method is effectively a set of rules and guidelines about how to declutter to live a more optimal life.[1] Waze and other route planning apps are tools we can use to optimize driving trips, spending less time and/or fewer miles driving.[2] College ranking systems are designed as optimized ways for students to select among the overwhelming number of colleges that exist to help them find a solution that best fits them. Even narrative storytelling can revolve around optimization, as characters in shows like *Lost* try to pick the optimal path in navigating between Locke's intuition and faith versus Jack's science and reason as the writers tell their story in the balance between the two.[3] Similar examples of optimization in daily life abound, from what is listed here to education,[4] gambling,[5] Walt Disney World trip planning and corporate staffing at the parks,[6] and a wealth of other examples that may crop up for you.

These attempts at optimization have downsides. The KonMari method was designed for a particular cultural context and does not really account well for the presence of kids in the home.[7] Even news coverage around Kondo noted that, although she is still focused on sparking joy, the birth of her third child meant that she is far less focused on keeping her own home tidy.[8] Route planning apps may optimize a route, but they route traffic

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through neighborhoods and increase the number of cars that can be on the road. An individual's optimized route has negative impacts on the people who have more cars coming down their smaller street, and making driving more convenient can lead to additional damage to the environment. Additionally, the optimized route designed by an app can lead to nonsensical or difficult choices, as I have been asked to turn left across multiple lanes of busy traffic on more than one occasion. College rankings may seem like a good way to pick a college, but in the best-case scenario, the data in the rankings is plagued by human error and definitional problems. Francie Diep notes that "even with perfect quality control, two institutions may still count the same numbers in different ways."[9] Top-ranking institutions often announce how they have identified problems with their submissions but only after they have already been ranked.[10] Rankings make a decision seem easy and optimal, but Colin Diver argues that the numerical scores have a salience problem, writing that "ranking numbers speak louder, often drowning out other, more edifying ways of assessing an institutions strengths and weaknesses."[11]

Writing about the impact of cultural "Moneyball" and a search for perfection, Derek Thompson argues that a quest for the optimal homogenizes culture as it "sacrifices diversity for the sake of familiarity. It solves finite games at the expense of infinite games. Its genius dulls the rough edges of entertainment," prompting him to ask, "can we ruin culture through our attempts to perfect it?"[12] Optimization often seems like it should be the way to make decisions, but the optimal often has downstream costs that may not be considered in the moment. Additionally, as choices narrow and align in favor of a clear, optimal path, incentives can be warped, and people may start chasing things that either are not optimal for them or, in the case of something like college rankings, will faced with situations where bad information may be misrepresenting what is actually best.

Turning back closer to games, it is worth tracking how optimization impacts similar kinds of activities. As documented earlier, sports have an incredible incentive to optimize around what is interesting to watch to drive viewership. Viewers lead to larger television contracts and more money in the sport, but the interests of each team can be in conflict with the interests of the group as a whole. In 2011 the National Hockey League (NHL) chose to leave ESPN to broadcast in the United States on a smaller network that offered slightly more money. In the wake of the decision, fewer people

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could watch the games, and ESPN opted to stop showing the vast majority of hockey highlights.[13] It was a short-run optimal play as the league got more money in the negotiation. However in the subsequent round of negotiations, the NHL went back to ESPN and the network returned to promoting the sport, garnering more viewers than in the previous arrangement.[14] What seemed optimal did not take everything into account, and hockey viewership in the United States suffered for years.

Tension can also come in disputes among teams about what is in the optimal interests of the group. Collective bargaining agreements structure relationships between players and franchises in most US sports, and like in plenty of other workplaces, there is inherent tension between players and management over issues of pay. In NBA basketball a luxury tax was put in place to penalize teams for spending too much money. At a certain amount of spending, teams are charged extra for each dollar spent, sometimes racking up a sevenfold multiplier on any spending. In the wake of their NBA championship in 2022, the Golden State Warriors governor said that the team was in trouble with the leadership of the league because they were spending too much.[15] A collective interest in keeping spending in check is in the best interest of the league as a whole, but spending more gave teams that were willing and able to pay a substantial competitive advantage over those who would or could not. The optimal competitive advantage for one team was a hindrance to others as they could not keep up, and the spending from the Warriors raised salary expectations for other players. Although I certainly am willing to spend more of a franchise's money, actually figuring out what is optimal depends on a specific position and set of circumstances. One of the first questions to assess in an analysis of optimization is: optimal for who?

Social strategy games show up in television series like *Big Brother* and *Survivor* and also in board games like *Mafia* and *One Night Ultimate Werewolf* or in video games like *Among Us* and *Goose, Goose, Duck*. The point of these games is to figure out other people, to play with and against them in order to figure out how to position them to enable your win. What is optimal for one is typically not optimal for all, and what is best for a player is rarely what is best for a viewer of the television shows. The emergent meta in games like *Big Brother* is to assemble a large, secret alliance and then steamroll the remaining people in the house. Building a proper structure can insulate a player, leaving them at little risk throughout the game and giving

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them a chance to cruise to a win. Watching the meta can demonstrate the capabilities of a virtuoso player, but what is optimal for that player is not what is best for viewers or the production team.

Esports are similar to traditional sports in many ways, but as Jeff Kaplan noted about *Overwatch*, one of the distinguishing factors of esports is that players can watch the pros and then go play the same game even if they cannot execute dominating strategies.[16] The recreational basketball or soccer I could play bears little resemblance to the sport played professionally, but the esports version of a video game at least seems more like the version I can play. Those esports pros are clearly more skilled, but I can at least attempt those moves, while faith in my ability to copy a professional traditional sport athletes was something that I grew out of in childhood. A belief in the ability to learn from and copy professionals gives recreational players a template for how to play. I may not be able to copy Lionel Messi's ability to kick a soccer ball, but I can roll out the same Ultimate Team squad as a high-level esports pro, use the same deck of cards as a highly ranked *Clash Royale* player, or choose the same *Overwatch* character as my favorite pro. My effort in those games is not likely to be nearly as good as theirs—there is a reason they are professionals—but video games make what is optimal for players seems stickier than in some other parts of life. When esports pros show the meta, the optimal way to play, video game players often think they may be able to execute the same, making optimization seem like the proper way to play the game and limiting the choices players are likely to make.

Interesting Choices

One of the key factors in how problematic a meta will be is whether it is seen as *the* answer or merely *an* answer. The primary point of theorycrafting and identifying a meta is to discover the best way to play a game. The original intent of theorycrafting was to use math to solve the equations underlying play in *World of Warcraft* in order to provide a list, a move or spell rotation, that was optimal and would help players chase a perfect performance. Figuring out the meta is about finding the most effective tactic available, not to inventory a variety of approaches and offer up a list of various strategies for certain situations. Taken into the context of a video game, optimization is often more like solving a puzzle than the

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indeterminant and complicated interplays that govern most of human interaction. The certainty and predictability of a video game combined with a desire from players to find what is best puts optimization in tension with good game design.

If good games are about putting players in positions to make interesting choices, then theorycrafting, metagaming, and other means of identifying the best way to play upsets that drama. Instead of needing to weigh a variety of approaches and choose one, the whole point of optimizing play is to find the best way to do something and then endlessly repeat the script. The point of a meta is to solve the choices, find the answers, and distribute the key. Theorycrafting and analytics are not about interesting choices; they are about identifying and repeating the best choice.

The increasing turn toward video games as a service complicates players' efforts at discovering what is optimal. Unlike previous modes of game development, where games were released and never adjusted, the games as a service model builds patches and updates into the framework of a game. It is known that the game will change, which gives game developers a chance to shake up how it is played and disrupt the meta should they wish. Developers can use the service side of the game to release something new that addresses what was dominant, although new additions can also end up establishing a new, more problematic meta, as was the case with the introduction of Brigitte into *Overwatch*. Games as a service also offer more chances to charge players, which can lead them to come together to identify the meta or other loopholes to avoid spending much money on the game. Increasingly, games as a service can make the meta in video games dynamic, like how *Clash Royale* mixes up what is most powerful on a regular basis.

A key piece to note about optimization is that the process of figuring out the meta, at least when it starts, can add value to the game, extending discussion and play far outside the bounds of the game itself. Figuring out the answer to a game can be exhilarating; the theorycrafting can be more fun than the game itself, particularly before the point where a game is solved. As a Reddit user puts it in comparing two game modes in *Star Wars: Galaxy of Heroes*, "it's been mentioned in just about every thread that the problem boils down to TB [Territory Battles] just being an exercise in brute force. It was pointed out yesterday that Raids can be fun because figuring out the key strategies and implementing new theorycraft can be fun. There's no

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theorycraft in TB, it's just 'hope you[r] guild has whales and focus on one territory at a time.'"[17]

The specifics of the game modes are not incredibly important here as they can likely be swapped out for plenty of modes in other games. Effectively, the user is arguing that in Territory Battles there are no interesting choices because the group's success or failure of the group comes down to a singular, repeated, brute force strategy. On the other hand, they see excitement in raids since they are novel puzzles to figure out and solve. So long as the theorycrafting is seen as unsolved as something that is pending and where the outcome is indeterminate, the quest to figure it out adds to the game. In those cases, theorycrafting becomes part of the game, the search for an answer gives additional value and another activity to do, and it is a metagame.[18] The game expands and becomes more interesting. However, the Reddit user does not mention the downside impact of theorycrafting and raiding. The first time winning a raid is amazing, a high often met by great joy, but the regular repetition of the same battle over and over starts to drag. Theorycrafting can be fun but only until it is resolved. When the metagame eventually solidifies into the meta of a game, the fun activity of discovery vanishes. When the answer is found and the repetition begins, the process is much closer to tic-tac-toe, baseball, and status as a solved game than we may think in our initial considerations and idealistic hopes.

One of the primary tensions in addressing a player's drive to optimize their play within games is the culture surrounding video games. As players have grown up on decades of theorycrafting and analytics have spread throughout society, the search for a singular, clear answer is seen as appropriate and desirable by many. A pair of the game series that confound traditional game players are *Mario Party* and *Mario Kart*. Although there are strategies and suggestions for how to play the games well, both resist the easy dominance of a meta. There are strategies and relatively better or worse approaches, but the indeterminacy and luck built into the game resists a clear strategy.[19] However, that does not stop people from trying. In an article about how a math teacher analyzed the various dice players can use in *Super Mario Party*, Ethan Gach concludes by writing "while it's not enough to transform *Mario Party* into a game of sheer skill, it does add a nice layer of light strategizing that lets people approach the game differently. Of course, as I said in *Kotaku*'s VG chat about the game earlier today, I'd like to see the

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series adopt even more RPG mechanics and go full-blown *D&D*, but for now unique dice will have to suffice."[20]

Adding skill and something to strategize or optimize around is something to be praised, a highlight of why this version of the game is at least slightly better than the others. Notably, that referenced chat among Kotaku contributors is framed as a debate about whether or not the game is "actually evil" and begins with the acknowledgment that although Cecilia D'Anatasio found the game to be "a great take on a classic formula, in my opinion, but it's certainly not just me here. Some of you guys hate the living shit out [of] it. And we're not just talking about *Super Mario Party*. We're talking about the whole *Mario Party* series."[21] Adding skill to the game would potentially make the game less evil and less dependent on luck, largely because those additional layers of play would support the kind of analysis that began with the dice. The lack of support for theorycrafting is part of what can make a game like *Mario Party* so frustrating. It is hard to play the game better since the interesting choices in the game cannot easily be optimized or theorycrafted. With *Mario Party*, players are largely along for the ride. The resistance and vocal outrage to games that do not readily support analytics-driven analysis and optimization makes it quite difficult to disrupt players' efforts to solve games, but some examples offer space for reflection about how to reflect on complicating player-led efforts to solve a game.

One form of play to take inspiration from in questions of optimization is the practice of speed running. In speed running, players are trying to complete a game as quickly as possible, generally under certain conditions or rules regarding a given competition or record. Speed running is all about optimization, about finding the best, most efficient way to do something. However, it also adds depth to the typical notion of theorycrafting play. Speed running is almost by definition an instrumental kind of play based on repetition. In seeking the virtuoso play that speed running requires, top speed runners seek any edge they can find within the rules to move farther and faster. New innovations can be found after years of playing a game, like a bomb trick that helps Link quickly move across the map in *Breath of the Wild*, which keeps speed running fresh, as players find something new and then relentlessly figure out how to use the new insight more effectively to shave down the time on a new record.[22] Speed runners play the same sections of game over and over, practicing to get the edge they need to do

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better than before. As this kind of play is set up as a kind of solved game from the beginning, it loses very little from efforts to optimize it. Instead of situations where theorycrafting limits the game and moves it toward a lack of dynamism, the type of play in speed running is already predicated on knowing the solution. The repetition is the point. Shifting the frame for the game and designing around instrumental play is one way that a video game could elide concerns about what theorycrafting can do to play.

Another area where games can push beyond the limitations that can come from theorycrafting is in games based on an endless search for a high score. In the case of *Tetris*, a game released decades ago, in 2021 players began to play the game with a novel technique for manipulating the blocks. The new style, called rolling, involves rolling fingers from one hand across the back of the controller while applying pressure to the D-pad with the other hand. Players using the technique quickly started posting world record scores, and the technique replaced hypertapping, which had been the dominant technique for a few years.[23] The search for new techniques is fascinating and is in line with theorycrafting approaches to optimize play. However, the impact on *Tetris* is different. Each new strategy opens up an opportunity to do things better, eclipsing what was and opening a search for new techniques that can post even higher scores. In the case of a high-score-based game, the search for the optimal way to play opens up promise and makes the game bigger as players chase doing more rather than making a game smaller as they find a definitive right answer and disregard other options.

There are some brute force approaches developers can take to disrupt efforts to optimize their game. *Overwatch* moved into role locking and hero pools where certain characters cannot be played. *Overwatch 2* moved to five players rather than six so that the second tank that facilitated the GOATS meta could no longer be an issue. *League of Legends* uses a ban phase, where each team can strike certain characters from play. *Dota Underlords* combined elements of the ban and hero pools through a daily jail, where certain characters are placed in jail each day, which, according to Nathan Grayson, "keeps things fresh: The meta can't calcify around a single strategy if the hero selection is changing slightly every day."[24] Developers can step in with these direct efforts to shake play up. The novel piece of the jail in *Dota Underlords* is that the presentation is particularly cheeky, with a list of "Today's Jailbirds" accompanied by a list of the jailed characters and brief

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explanations of why they got busted. Taking a direct approach to disrupting how players engage the game makes it harder for a stable meta to form. Approaches like the prematch bans in *League of Legends* risk simply forming a different kind of meta based on the best characters to ban, but a dynamic, more developer-driven approach can make it harder for players to optimize around the rules of the game.

Another approach to combating a meta is to simply let the game sit and see where players take it. In an article expressing a general loathing for game updates, William Antonelli writes about how something beautiful happened with the meta of the cartridge-based *Super Smash Bros. Melee*. Without updates to the game, the players were left to sort things out for themselves as the developers could not come in and adjust the relative abilities of characters. This left players to figure out what was possible on their own, and characters still became more and less valued over time. Antonelli wrote that "the meta evolved by itself, without any thumb on the scale from Nintendo. There were no patches or reworks, just fans coming up with new ways to play the same game."[25] This approach has the added benefit that if you have ever played the game, you can step back into the same context, not needing to learn all the things that have changed since you last played. Antonelli wonders why more developers do not pursue this kind of approach, asking "Why do developers have to destroy the strategies their players invent? It builds a cycle where players build metas, developers issue updates to change those metas, people complain that the metas don't work anymore, new metas are made, new updates break them, and on and on forever."[26]

A no-update take on a meta lets the game breathe and forces players to sort out the best ways to play over time. Given enough players and a dynamic enough set of incentives for showing player skills, letting the game sit without updates could be a valid approach to take. This is much harder in the case of games as a service, though, as players expect changes and additions as part of the deal. If the game is not updated and relative values are not changed, how can a company reasonably add additional costs for the game? Antonelli offers an interesting way to think about optimization in games and provides a clear example of how players can sort things out on their own, but the no-patch approach may be hard to integrate into contemporary games.

Another way for game developers to disrupt the meta is to encourage players to reflect on what they lose in the search for a singular, optimal

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approach. In an article arguing against using tier lists to pick characters, Maddy Myers contends that tier lists limit game play and make playing a game more instrumental and less fun.[27] Tier lists originated in discussions around fighting games as players ranked the relative value of various characters in the game.[28] The idea of ranking things based on a tier list has subsequently spread throughout the internet, and there are plenty of tier-style rankings to be found, from snack foods to sodas. However, these more personal rankings deviate somewhat from the point of the fighting game tier list. Tier lists of nonvideo-game-related material are often played for laughs since both the person making the list and the audience are in on the joke that the list is subjective and personal. However, within video games, tier lists are debated with the goal of establishing them as fact, gathering the top characters or options in the S or God tier and then proceeding down to the worthless options that only a fool would choose. A video game tier list is intended to optimize, to find the best, right answer and strongly encourage players to focus on the top of the list if they want to win.

Meyers ends up concluding that she is most interested in playing fighting games for fun, arguing that what tier lists actually show is what is popular, not necessarily what is powerful. She writes "Tier lists are broken, then, and that brokenness warps everything around it. They enforce homogeneity to everyone's detriment; competitive and casual players alike would benefit from playing with characters they're not comfortable with."[29] Developers can take advantage of this, reminding players why they are playing the game in the first place and stressing that the point is to experience and learn rather than to seek to optimize. When a tier list is sorted, if it is accepted by the community, then the game immediately becomes limited since choice narrows down to the handful of best options. If it is necessary to patch and update a game, it can be useful to prompt reflection about how players' desire to optimize and rank can fold the game in on itself, making it less fun for everyone.

One of the reasons players may seek out optimal strategies is simply because the game is too hard. It is possible to address game difficulty through a variety of settings, although the history of the game community encouraging the selection of harder difficulty levels reaches back deep in the annals of gaming. The growth of variable settings, where players can pick something like story mode, opened up a door to think more broadly about difficulty in games. Polygon's 2020 game of the year, *Hades*, did something

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novel to adjust the difficulty for players. Instead of having a list of different difficulty options, like easy to hard, that players may not opt into given their desire not to play on "easy mode," *Hades* introduced God Mode. If players turn God Mode on, incoming damage is immediately reduced by 20 percent, and that number ticks up each time they die until it reaches a maximum of 80 percent damage reduction. Maddy Myers argues that the mode is "a way to see the rest of the game without so much friction—and the rest of the game is well worth seeing."[30]

God Mode also takes the edge off the game, allowing players to toggle it on and off based on the relative difficulty level of given fights.[31] The option is more fine grained than easy or hard options, letting more players experience the full game and also taking the pressure off finding the best way to play. The label "God Mode" is also less stigmatizing than "easy," possibly leading more players to use it. The harder the game, the more players need any edge they can get as developers may inadvertently push them to optimize and flatten a game. However, in *Hades* the dynamically adjusted difficulty level means that players can play how they want without needing to worry too much about figuring out the optimal choices to make.

Developers have many levers to pull in trying to retain the interesting choices built into their games. Keeping those choices lively requires careful planning for how players will try to pin down and solve a game. The best approach can be designing into optimization, pushing for communities like speed runners or for high scores to reward optimization. Alternately working with the community can help players reflect on the fun they may lose by locking in on one way of playing. Optimization is not inherently bad, but game developers and game players both have a vested interest in keeping games from being solved.

Common Pools

At the heart of the problem with optimization in games is the way that theorycrafting prompts a common pool resource problem. In a single-player game this may not be a huge issue, as my efforts to optimize my own play do not really impact you. However, when the game goes into a multiplayer competition, each player's actions impact the other. The moment other players begin to optimize their play, pressure is put on the rest to match them and do the same. Opting out of known theorycrafting has

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consequences, including playing from a weaker position and being judged by other members of the community for not adhering to the common expectations of the game.

Multiplayer games are something we share together when we play them. We have a vested interest in keeping interesting games vibrant, enabling more players to engage in games in compelling ways. Processes of optimization, however, focus on the I. What can I do better? How can I win the game? How can I be the best? Theorycrafting can take away the interesting choices that are one of the wonderful part of games, effectively befouling our common pool with limited choice and structured options.

There are ways to set up groups to be better at addressing common pool resource problems as they arise. Developing a productive, positive community that has a vested interest in working together can help people give each other the benefit of the doubt in deliberations over any sort of resource allocation. Incentivizing cooperation and enabling easy communication among players can prime them to engage in positive ways, ones where they may be able to help solve any issues that arise. When players are pitted against each other or see themselves in competition, they are far more likely to seize any advantage they see. Game design based on scarcity, exclusive competition, and loss will prompt players to find edges and seek boundaries in order to do a little bit better than their foes. On the other hand, priming players for collaboration and considering the best interests of the whole can help us reflect on how to make a game and the community around it better. Preventing players from getting into a scarcity mindset in the first place can help players and developers address problematic issues with optimization and the meta before they begin.

Instead of simply searching for a clear way to play games in the best way possible, rewarding emergent, exploratory play can expand a game and lead players to make it more interesting through their dynamic interactions. Optimized play serves the interest of the individual while focusing on the experience of play and what we can do together can make video games more interesting for us all. What if instead of seeking out the theorycraft to solve games, we focus more on the interesting choices games give us to keep games dynamic for the benefit of all?

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Chapter 4

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Chapter 5

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